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CANADA DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

of the

FOREST INSECT AND DISEASE SURVEY

FOREST BIOLOGY DIVISION

SCIENCE SERVICE

1958

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FOREWORD

Although few changes occurred in the organization and facilities of the Survey in 1958, there were a number of noteworthy developments: several changes in insect and disease conditions were of considerable interest and importance; the first volume of a national compilation appeared; and Survey leaders met to consider the field aspects of the national Survey program. These developments are discussed below and further details of insect and disease conditions may be found in the regional contributions that follow.

The most important organizational change was a strengthening of the Survey staff at divisional headquarters. Mr. P. A. Jones joined the staff in July to take an active part in the program of national compilations of Survey data. Regional Disease Survey staffs were strengthened by the addition of one research officer and three technicians. Minimum staff requirements are still lacking in some regions and further additions are planned. The only important change in ranger staff organization was the elevation of two positions to the regional supervisor level to provide for better organization of field work in Alberta and the coastal region of British Columbia. The only major change in facilities was the construction of a ranger field headquarters at Crimson Lake near Red Deer, Alberta.

In September, 25 senior officers and rangers of the Forest Insect and Disease Survey met for 5 days at Black Sturgeon Lake Field Station in northern Ontario. The facilities and arrangements provided by officers of the Forest Insect Laboratory, Sault Ste. Marie, formed an excellent background for discussions of the field aspects of the Survey program. The frank and spirited exchange of views proved most stimulating. The meeting was the largest and most comprehensive gathering of persons directly involved in the operations of the Survey and as such should contribute greatly to its development as a truly national project. The most encouraging features of the meeting were the great similarity in procedures and problems in all regions and the extent to which insect and disease interests have been integrated. Plans for the present series of national compilations were consolidated and provisional plans made for the next series.

A significant feature of 1958 was the varied and unusual weather conditions that prevailed in many sections of Canada and the resultant effects on insects, diseases, and general tree growth and vigor. The Atlantic Provinces and the Gaspé region of Quebec experienced a mild early spring and a warm moist summer which favored tree growth and many foliage diseases. Unfortunately these conditions were marred by a period of low temperatures in the late spring that were accompanied by sleet and freezing rain. The most severe tree damage occurred in restricted parts of New Brunswick, Cape Breton Island, and the Avalon Peninsula of Newfoundland. In the rest of Quebec and in Ontario, a cool moist summer followed a rather late spring. Frost damage was limited, tree growth generally good, and foliage diseases fairly common. The eastern part of the Prairie Provinces, particularly southern Manitoba, had a very early, warm, wet spring that was interrupted by a period of very low temperatures (7°F.) in late April. This combination of events resulted in extensive winter drying of conifers and severe injury to the buds and twigs of many tree species, especially balsam fir and trembling aspen. In many areas frost injury or starvation greatly reduced spruce budworm and large aspen tortrix numbers. In British Columbia weather conditions attracted considerable attention and caused much damage to trees, some of which will not become fully apparent for

several years. The winter period was generally mild and unusually short. Spring and summer temperatures were extremely high and precipitation very low. The resultant drought conditions were particularly severe in the ordinarily humid coastal regions. Forest fires were numerous and the extreme hazard caused many prolonged forest closures. Many types of tree injury were observed, some becoming apparent as early as June.

Spruce budworm outbreak conditions in 1958 can be briefly summarized as marked reductions in eastern Canada and modest increases in central and western Canada. Budworm numbers were very low in Newfoundland and much reduced in Nova Scotia. The most significant development in the Atlantic Region was the further decline of the large outbreak in northern New Brunswick and Gaspé to a point where no aerial spraying is contemplated in 1959. Some moderate feeding is expected in restricted areas, mainly in the south-central part of New Brunswick. In contrast, the outbreak in northwestern Ontario and eastern Manitoba continued and spread farther eastward over an additional 1900 square miles. Marked declines were recorded in northern sections of the outbreak as a result of host tree mortality and in western sections from the extreme weather conditions mentioned above. Defoliation became more evident in a number of relatively small outbreaks in Saskatchewan and Alberta. The outbreak along the Mackenzie River was not surveyed in 1958. The outbreak in southwestern British Columbia remained static while the outbreak of the 2-year-cycle form in the Babine Lake region continued at a very high level. Defoliation was severe and very high egg counts indicate a continuation of similar conditions in 1959.

Unusual numbers of colonies or large-scale larch sawfly outbreaks were mentioned in all regional reports. Population levels increased at several points in Newfoundland. In Nova Scotia severe damage was no more common but colonies were collected much more widely. The first collections in 17 years were made in northern New Brunswick. A general increase in abundance was reported for central and southern Quebec and high numbers persisted in western Quebec. In Ontario light to moderate infestations continued in the northwestern and northern regions, severe infestations were present throughout the central regions, and colonies were common in the south. Infestation conditions remained static in Manitoba and Saskatchewan with the most severe defoliation taking place in the northern part of the latter Province. Marked increases in area and severity were reported from Alberta and more than the usual number of colonies were observed on tamarack trees at several points in northeastern British Columbia.

Reference is made to the forest tent caterpillar in several regional reports. Considerable defoliation was recorded at many locations in the Prairie Provinces and in northeastern British Columbia. Colonies were common at three widely separated points in Ontario and in southern British Columbia. Egg counts in many of these areas suggest still higher numbers in 1959.

Other outstanding insect conditions in 1958 were: marked declines in large aspen tortrix outbreaks in Ontario, Manitoba, and Saskatchewan; weevil damage in Christmas tree plantings in southern Ontario; defoliation by Bruce spanworm and associated aspen feeders in Alberta; and the discovery of the balsam woolly aphid on amabilis and grand fir in and around Vancouver.

The most striking and timely disease conditions in 1958 resulted from the direct or indirect effects of the abnormal weather conditions discussed above. There were, however, several other noteworthy developments. An intensified search following the initial record in 1957 showed that the Dutch elm disease is well established in the St. John River Valley from just north of Fredericton almost to Grand Falls. This disease was also the subject of intensified surveys in Ontario and its known range was extended considerably northward in the

Muskoka and Haliburton regions. White-pine blister rust was collected for the first time from white pines in southeastern Manitoba and from limber pine in Waterton Lakes National Park in Alberta. A severe outbreak of yellow-pine needle blight occurred in the southern interior of British Columbia.

A large number of contributions based on Survey activities were published during 1958 in scientific journals and in the Bi-Monthly Progress Report of this Division. A complete list of these articles follows and readers are also reminded that a wide variety of interim and annual reports dealing with regional insect and disease conditions are distributed to interested parties by all Forest Biology laboratories.

Beique, R. and P. Bouchard. Observations on a new poplar leaf miner, *Phytagromyza populicola* (Hal.). Bi-Monthly Progress Report 14 (4): 1. 1958.

Bitz, W. E. and D. A. Ross. Population trends of some common loopers (Geometridae) on Douglas fir, 1949-1956, in the Okanagan-Shuswap area. Bi-Monthly Progress Report 14 (5): 2-3. 1958.

Brown, G. S., A. P. Randall, R. R. Lejeune, and G. T. Silver. Black-headed budworm spraying experiments on Vancouver Island, British Columbia. For. Chron. 34: 299-306. 1958.

Condrashoff, S. F. Differences in aspen phenology and survival of immature stages of *Phyllocnistis populiella* Chamb. Bi-Monthly Progress Report 14 (6): 3-4. 1958.

Davidson, A. G., C. C. Smith, and A. E. McCollom. Dutch elm disease firmly established in New Brunswick. Bi-Monthly Progress Report 14 (5): 1. 1958.

Eidt, D. A. and W. L. Sippell. A moth attacking larch shoots in eastern Canada. Bi-Monthly Progress Report 14 (1): 1. 1958.

Evans, D. Two-year life cycle of *Pseudohazis eglanterina* (Boisduval). Can. Ent. 90: 125-127. 1958.

Evans, D. Storage of preserved insect specimens. Can. Ent. 90: 461-463. 1958.

Ghent, A. W. and D. R. Wallace. Oviposition behaviour of the Swaine jack-pine sawfly. For. Sci. 4: 264-272. 1958.

Ives, W. G. H. and R. M. Prentice. A sequential sampling technique for surveys of the larch sawfly. Can. Ent. 90: 331-338. 1958.

Lindquist, O. H., A. A. Harnden, and W. L. Sippell. A tube maker on red pine in Ontario. Bi-Monthly Progress Report 14 (2): 2. 1958.

Martin, J. L. Observations on the biology of certain tortricids in young coniferous plantations in southern Ontario. Can. Ent. 90: 114-124. 1958.

Martin, J. L. A note on *Exoteleia dodecella* L. Bi-Monthly Progress Report 14 (4): 2. 1958.

Martin, J. L. The bionomics of the pine bud moth, *Exoteleia dodecella* L., in Ontario. Can. Ent. in press.

McGuffin, W. C. Biological and descriptive notes on noctuid larvae. Can. Ent. 90: 114-124. 1958.

McGuffin, W. C. The larvae of *Deilinea* Hübner (Lepidoptera: Geometridae) with notes on other stages. Can. Ent. 90: 216-223. 1958.

McGuffin, W. C. Larvae of the Neartic Larentiinae (Lepidoptera: Geometridae). Can. Ent. 90: Supp. 8. 1958.

McGugan, B. M. comp. Forest Lepidoptera of Canada recorded by the forest insect survey. Vol. 1 Papilionidae to Arctiidae. Can. Dept. Agr. Pub. 1034. 1958.

Molnar, A. C. and R. G. McMinn. The current status of pole blight in British Columbia. Bi-Monthly Progress Report 14 (3): 3-4. 1958.

Neilson, M. M. and F. G. Cuming. Egg parasitism of the fall cankerworm. Bi-Monthly Progress Report 14 (6): 1. 1958.

Newell, W. R. Decay of storm-damaged conifers in New Brunswick. Bi-Monthly Progress Report 14 (1): 1. 1958.

Prentice, R. M. and L. D. Nairn. Increment reduction of Scots pine following two years of defoliation by the jack-pine budworm. Bi-Monthly Progress Report. 14 (2): 3. 1958.

Silver, G. T. Studies on the silver-spotted tiger moth, *Halisidota argentata* Pack., in British Columbia. Can. Ent. 90: 65-80. 1958.

Silver, G. T. Control operations against phantom hemlock looper, *Nepytia phantasmaria* Stkr. in British Columbia. Bi-Monthly Progress Report. 14 (6): 3. 1958.

Thomas, G. P. and H. M. Craig. Winter injury and subsequent mortality to Douglas fir. Bi-Monthly Progress Report 14 (4): 3. 1958.

Wallace, D. R. and W. L. Sippell. First records of two pine sawflies in Michigan. J. Econ. Ent. 51: 125. 1958.

Watson, W. Y. An unusual feeding habit of *Tortrix alleniana* Fern. Bi-Monthly Progress Report 14 (2): 1. 1958.

The first volume of the "Forest Lepidoptera of Canada" series appeared late in 1958. This publication represents the results of a national Survey endeavour that has been under way for nearly three years. Each regional laboratory has been responsible for compiling information from their records on the distribution, hosts, feeding habits, abundance, and seasonal history of the insect species under review. Integration of these records was accomplished at divisional headquarters. At least one and perhaps two additional volumes will be published or in press during 1959.

Further information on any of the summary statements presented in this Report or copies of the above publications are available on request. Comments on the content and organization of this Report are always appreciated.

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Forest Biology Division.

ATLANTIC PROVINCES

FOREST INSECT SURVEY

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INTRODUCTION

This section of the Report includes a general account of the status of 37 forest insects that either caused noticeable injury to forest and shade trees in 1958 or are potentially important. Many more species were collected and reared. The highlights of regional insect conditions by host tree are outlined in the following paragraphs.

Balsam Fir: Important reductions in spruce budworm numbers occurred in New Brunswick and in Nova Scotia. The balsam woolly aphid continued to be a serious problem in all Atlantic Provinces; the known distribution of the insect increased slightly in New Brunswick and in western Newfoundland. The intensity of infestations increased in central New Brunswick following population reduction caused by extremely low temperatures in January, 1957. Infestations of gall midges on needles were still common in some areas of the Maritime Provinces but generally less severe than in 1957; two species of midges are involved.

Spruce: The eastern spruce bark beetle caused mortality of white spruce trees in three localities on Cape Breton Island; these trees had been attacked by the spruce budworm for a number of years. The killing of overmature white spruce stands by the bark beetle was reported from two areas of Newfoundland. The polyhedral virus disease and introduced parasites of the European spruce sawfly were recovered over wide areas, despite low sawfly numbers.

Tamarack: Larch casebearer numbers were low throughout most of New Brunswick, moderate in Nova Scotia, and low in Newfoundland. The larch sawfly was widespread in southern and western Nova Scotia, but, except for two areas, infestations were light. The insect was collected in northern New Brunswick for the first time in 17 years. Moderate to severe infestations occurred in Newfoundland.

Pine: No serious infestations of pine-feeding insects were observed.

Birch: Birch casebearer attacks were moderate to severe in central and northeastern New Brunswick, in parts of Cape Breton Island, and in two areas of Prince Edward Island; elsewhere in the Maritimes infestations were generally light. The birch leaf miner was common throughout the Maritime Provinces, causing variable amounts of defoliation of white birch and wire birch trees. The birch leaf-mining sawfly was observed only in Nova Scotia where it was often associated with the birch leaf miner.

Poplar: Satin moth infestations were confined to a few ornamental poplar trees at widely separated localities in all Provinces.

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BEECH: The northern limits of known beech scale attacks in New Brunswick were slightly extended. Infestations near Fredericton were more severe than in 1957, but little change in the status of the insect was observed elsewhere.

OTHER DECIDUOUS TREES: The winter moth was found in new areas of Nova Scotia in Colchester, Cumberland, Kings, and Annapolis counties. Little change occurred in the distribution and intensity of older infestations. Severe infestations of the fall cankerworm were observed only in the Annapolis Valley, Nova Scotia. Webs of the ugly-nest caterpillar were common in the early summer on roadside cherry bushes in central and southern New Brunswick and in central Nova Scotia. In late summer, noticeable webbing on a variety of hosts in southeastern New Brunswick and in Nova Scotia was caused by the fall webworm.

Parasite records new to the Survey in the Atlantic Provinces were obtained for the larch casebearer, fall cankerworm, winter moth, and for midges on balsam fir needles. New information on the distribution of forest insects was obtained for the balsam woolly aphid, beech scale, winter moth, larch shoot moth, native elm bark beetle, and mountain-ash sawfly.

The assistance and co-operation of Forest Protection Ltd., the Newfoundland Forest Protection Association and various government and industrial agencies is much appreciated.

Insect collections in the Atlantic Provinces totalled 4,356. The collections were distributed as follows: New Brunswick, 1,449; Nova Scotia, 1,961; Prince Edward Island, 125; Newfoundland, 821. Special reports totalled 324. The numbers of collections by major tree species were as follows:

Coniferous trees	Collections	Broad-leaved trees	Collections
Balsam fir	995	Birch	
Spruce—		White birch	119
White spruce	834	Wire birch	30
Red spruce	153	Yellow birch	6
Black spruce	5	Miscellaneous birches	32
Miscellaneous spruces	384		
	1,376		187
Tamarack	860	Poplar	
Pine		Trembling aspen	61
Eastern white pine	90	Silver poplar	14
Jack pine	29	Largetooth aspen	10
Red pine	25	Balsam poplar	5
Scots pine	6	Carolina poplar	2
Miscellaneous pines	5	Miscellaneous poplars	73
	155		165
Eastern white cedar	17	White elm	55
Eastern hemlock	14	Maple	
		Red maple	56
Total	3,417	Sugar maple	5
Miscellaneous hosts or host unspecified	223	Silver maple	2
		Miscellaneous maple	22
			85
		Oak	
		Red oak	76
		Miscellaneous oak	1
			77
		Cherry	89
		Mountain ash	29
		Beech	16
		Willows	13
		Total	716

Grand Total 4,356

MARITIME PROVINCES

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—The extent and severity of spruce budworm infestations in the Maritime Provinces in 1958 were much reduced from previous years. F. E. Webb, in a report on aerial spraying studies in New Brunswick, said "Prospects of final collapse of the outbreak in 1959 are indicated by significant increases in the effectiveness of certain natural control factors, notably parasites, which do not appear to have been adversely affected in sprayed areas. The possibility of a resurgence should not be overlooked, however, because the susceptible forest condition that initially proved favorable for outbreak development has been largely preserved by spraying." Also, he said that spraying appears to be unnecessary in 1959.

The accompanying infestation map is based primarily on the loss of new foliage of balsam fir or white spruce. The classes of infestation are: severe, over 70 percent; moderate, 30 to 60 per cent; light, trace to 20 per cent. Attacks in the older outbreak areas in northern New Brunswick were light. Moderate and severe attacks were generally patchy and scattered and largely confined to central areas of Carleton and York counties, central and northern Sunbury County, eastern Kent County, and parts of Northumberland and Gloucester counties. Of several hundred egg-mass samples taken throughout the Province, only a few indicated that moderate to severe defoliation would occur in 1959; these were found chiefly at scattered locations in the central areas of York and Sunbury counties.

In Nova Scotia the reduction in budworm numbers from 1957 was striking. The most severe defoliation of white spruce was observed at Strathlorne and at Ingonish; about 20 per cent of the new needles were destroyed at each locality. Near North River only a trace of defoliation on new shoots of balsam fir was observed, compared with about 70 per cent destruction of the new foliage in 1957. The highest egg counts were made at Ingonish Beach where the numbers per 100 square feet of foliage surface were 78, compared with 848 in 1957. Elsewhere in the Province, no egg masses were found at 100 out of 120 locations sampled, and numbers at most of the remaining 20 locations were greatly reduced from 1957.

In Prince Edward Island, defoliation of the new shoots of balsam fir was very light, but varied from 30 to 60 per cent at New London, Brackley Beach, Covehead, Corran Bay, Stanhope, Pisquid, and Orwell in Queens County; and at Dingwell and Hermanville in Kings County. Egg sampling indicated that defoliation of new shoots in 1959 will be severe at Orwell and light to moderate at the other locations listed above, and at Milton, Queens County, and at Poole's Corner, Kings County. Elsewhere, budworm numbers in 1959 are expected to be low.

	Reports	Collections	Larvae per tree sample	
			Av.	Dev. from 1957
New Brunswick	12	403	6.9	−7.0
Nova Scotia	13	101	4.9	−5.5
Prince Edward Island	2	68	8.5	+4.5

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)—The known limits of distribution of this insect in Northumberland County, New Brunswick, were extended slightly northward by the location of 'stem attack' on one balsam fir tree near Rosaireville and by the presence of light to severe 'stem attacks' on a few trees near Doaktown.

Detailed studies by R. C. Clark in the Fredericton area indicated that infestation intensity has increased considerably following high winter mortality in 1957. 'Stem attacks' of varying intensities were observed near Cocagne

River, Westmorland County; Hayward Brook, Kings County; and at several points between Fredericton and the Acadia Forest Experiment Station.

Examination of stands in Pictou, Antigonish, Victoria, and Inverness counties, Nova Scotia, showed that most of the mature balsam fir has been killed and the remainder is suffering from 'gout'. In immature stands, the amount of mortality is variable but 'gout' is generally prevalent. Many stands have been virtually destroyed before reaching merchantable size. Others have survived and some of the gouty trees show signs of possible recovery. In Victoria County, the damage was generally older and more severe at lower elevations, but very severe damage occurred at elevations as high as 1000 feet and many trees have died from 'gout' in the past few years at the tops of Smoky, French, and North mountains. Infestations, however, are rare and damage is negligible on the more southerly portion of the Plateau.

'Gout' has been the more serious form of injury throughout the Province and severe 'stem attack' has not been common. The most serious 'stem attacks' were observed near Harrison Settlement, Cumberland County, where about 17 per cent of trees on a plot have been killed and most of the remaining trees support light attacks.

'Gout' remained common in Prince Edward Island and 'stem attack' continued on a few trees at Brundenell River.

Two additional coccinellid predators from Australia and from Japan were released in New Brunswick.

	Reports	Collections
New Brunswick	16	5
Nova Scotia	12	4
Prince Edward Island	3	1

Gall Midges on Balsam Fir Needles, *Dasyneura* sp. prob. *balsamicola* (Lint.), and an undetermined species near *Cecidomyia*—These gall midges were common in many parts of the Maritime Provinces but, in general, infestations were much less severe than in 1957. The most severe attacks occurred in Nova Scotia near Noel and Kennetcook, Hants County; at Westchester Station, Cumberland County; from Upper Stewiacke, Colchester County to Musquodoboit and Burke Lake, Halifax County; at Chezzetcook and Cooks Brook, Halifax County; near Mount Hanly, Annapolis County; and in several areas of Lunenburg County, including East River, Martin's River and Stanburn.

The rearing of midge larvae has produced adults of two species: one identified as *Dasyneura* sp. probably *balsamicola* (Lint.) by J. R. Vockeroth; the other not yet identified, but near *Cecidomyia*. The relative importance of each in causing injury to balsam fir needles is not known.

Many parasite specimens have been reared, but not identified. It appears that parasitism has had an important effect in reducing population levels of one or both species of midges.

	Reports	Collections
New Brunswick	14	40
Nova Scotia	9	59
Prince Edward Island	2	—

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.)—No tree-killing infestations of the hemlock looper are on record in the Maritime Provinces. The insect has been destructive in Quebec and in Newfoundland, and because of its wide distribution on balsam fir in all parts of the Maritimes, it is a potentially serious pest. Numbers remained low throughout the Region in 1958.

			Larvae per tree sample	
	Reports	Collections	Av.	Dev. from 1957
New Brunswick	—	27	0.5	−0.4
Nova Scotia	7	119	0.6	−0.4

Black-headed Budworm, *Acleris variana* (Fern.)—The largest collection in the Maritime Provinces was taken at Big Mark Corner, Digby County, where the sampling of three eastern hemlock trees produced 28 specimens. No defoliation was observed.

			Larvae per tree sample	
	Reports	Collections	Av.	Dev. from 1957
New Brunswick	1	65	0.9	−0.5
Nova Scotia	6	69	0.8	+0.2
Prince Edward Island	—	5	1.3	—

Balsam Shoot Sawfly, *Pleroneura borealis* Felt—This insect caused noticeable browning of the new shoots of balsam fir reproduction in many parts of New Brunswick for the first time in several years. This damage, which looks like that caused by late spring frosts, was most evident in areas of Restigouche, Gloucester, Northumberland, York, Sunbury, Kings, and Charlotte counties.

	Reports	Collections
New Brunswick	5	19

Eastern Spruce Bark Beetle, *Dendroctonus piceaperda* Hopk.—Infestations were observed on Cape Breton Island at Strathlorne, Ingonish Beach, and New Campbellton, where white spruce stands have suffered severe budworm attacks for several years. At Strathlorne, the bark beetle has killed many of the older trees. A 25 per cent cruise in an area of about 6 acres at Ingonish Beach resulted in a tally of 216 trees, ranging in age from 60 to 75 years; 170 were unattacked, 17 supported light to severe bark beetle attacks, 12 died from attacks within the past 3 years, 6 died prior to 1954, and 11 died from other causes. The dead and infested trees have been cut and burned. At New Campbellton, in an area of about 400 acres, some 60 mature trees have died in the past 3 years, and other trees in the area support successful attacks.

	Reports	Collections
Nova Scotia	6	3

European Spruce Sawfly, *Diprion hercyniae* (Htg.)—Populations continued at endemic levels throughout the Maritime Provinces. Studies by D. E. Elgee on two plots near Fredericton showed that the polyhedral virus disease was present in 9 and 23 per cent of the larvae collected, compared with corresponding percentages of 8 and 18 in 1957. Parasitism from these plots, based on numbers of cocoons spun by larvae collected in the fifth instar, was 11 and 9 per cent. The collection and rearing of sawfly larvae from many parts of New Brunswick and Nova Scotia showed that the virus disease and introduced parasites are still playing a part in control.

			Larvae per tree sample	
	Reports	Collections	Av.	Dev. from 1957
New Brunswick	2	111	0.7	−0.9
Nova Scotia	9	230	1.3	+0.2
Prince Edward Island	1	5	1.5	+0.9

Yellow-headed Spruce Sawfly, *Pikonema alaskensis* (Roh.)—This insect caused noticeable defoliation of the top few feet of several dominant white spruce trees near Charles Cove, Guysborough County, Nova Scotia. Numbers were low in other parts of the Maritime Provinces.

	Reports	Collections
New Brunswick	1	8
Nova Scotia	8	44

Yellow Spruce Budworm, *Zeiraphera fortunana* Kft., and ***Spruce Bud Moth,*** *Zeiraphera ratzeburgiana* Ratz.—The larvae of these species are often found together and are usually common on the new shoots of white spruce in June, but seldom cause more than a trace of defoliation in the Maritime Provinces. Light defoliation was observed on white spruce shoots throughout eastern Nova Scotia. The yellow spruce budworm destroyed about 10 per cent of the new foliage of white spruce trees near Antigonish. Light attacks occurred on spruce hedges and blue spruce ornamentals at Truro, Halifax, and near Middleton.

	Reports	Collections
New Brunswick	7	113
Nova Scotia	5	114

Larch Casebearer, *Coleophora laricella* (Hbn.)—Browning of tamarack foliage was relatively light in New Brunswick, but more severe in Nova Scotia, where it was apparent in most tamarack stands examined.

In Nova Scotia the insect destroyed about 80 per cent of the foliage at the following locations: Brook Village and near Northeast Margaree, Inverness County; Fort Ellis, Colchester County; Danesville, Rhodes Corner, and New Germany, Lunenburg County; Summerville, South Brookfield, Caledonia and West Caledonia, Queens County; Allendale, Shelburne County; Glenwood, Eel Brook, Tusket, Pleasant Valley, Yarmouth County; and Springdale and Weymouth North, Digby County.

Casebearer numbers in New Brunswick were lower than expected; the rearing of some 2500 larvae from permanent sampling stations showed that parasitism by the introduced species, *Chrysocharis laricinellae* (Ratz.) and *Agathis pumila* (Ratz.), was an important factor in keeping population levels relatively low.

New recovery records were obtained for both parasites at locations in the following counties of New Brunswick and Nova Scotia:

Chrysocharis laricinellae (Ratz.)

New Brunswick—Restigouche, Madawaska, Kent, Kings, Westmorland counties.
Nova Scotia —Inverness, Guysborough, Pictou, Colchester, Cumberland, Lunenburg, Digby, Antigonish, Victoria, and Shelburne counties.

Agathis pumila (Ratz.)

New Brunswick—Madawaska, Victoria, Kings, Charlotte and Westmorland counties.
Nova Scotia —Antigonish, Pictou, Colchester, Cumberland and Digby counties.

Testing was continued of a sequential sampling technique for the casebearer, based on studies by F. E. Webb from 1950 to 1956 and outlined in the 1957 Report.

A summary of the general population levels of overwintering larvae in districts of New Brunswick and Nova Scotia is as follows:

District	No. sampling stations	Av. No. cases per sample	Infestation class
Southern New Brunswick	17	10.4	Moderate
Northeastern New Brunswick	13	0.5	Light
Northwestern New Brunswick	14	1.7	Light
Eastern Nova Scotia	16	10.2	Moderate
Western Nova Scotia	16	19.0	Moderate

	Reports	Collections
New Brunswick	1	81
Nova Scotia	9	411

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—Larch sawfly numbers in Nova Scotia were generally low, but colonies of larvae and traces of defoliation were found more commonly than in recent years. The accompanying map shows the distribution of light infestations present in Guysborough, Halifax, Lunenburg, Shelburne, Yarmouth, Digby, Hants, and Colchester counties. Numbers were highest near Hassett, Digby County and at Pope's Harbour, Halifax County, where defoliation was 40 and 60 per cent, respectively.

A few larvae were found at Hunter's Brook, Madawaska County, and at Miller Lake, Restigouche County, New Brunswick. A few isolated collections have been received in the past few years from the southern part of the Province, but this is the first time that the sawfly has been found in northern New Brunswick for about 17 years.

The insect was not found in Prince Edward Island.

Rearings by J. A. Muldrew of material collected in Nova Scotia in 1956 and in 1957 showed that successful parasitism by the introduced species *Mesoleius tenthredinis* Morley was 14 and 8 per cent respectively of total adult emergence.

	Reports	Collections
New Brunswick	2	2
Nova Scotia	7	101

Larch Shoot Moth, *Argyresthia laricella* Kft.—Further searching in 1958 has extended the known range of this insect considerably. In New Brunswick, the insect was collected at 21 localities in seven counties. In Nova Scotia, typical damage was found in Colchester, Cumberland, Halifax, Antigonish, Shelburne, and Queens counties; only one adult moth, providing confirmation of identity, was reared from shoots collected at Great Village, Colchester County. In Prince Edward Island, injured tamarack shoots were found in all counties.

Population levels in the Maritime Provinces were very low. Of 878 tamarack shoots examined in the Fredericton area in November, only 6 contained overwintering larvae.

	Reports	Collections
New Brunswick	4	22
Nova Scotia	3	22
Prince Edward Island	1	4

Pine Leaf Chermes, *Pineus pinifoliae* (Fitch)—The pine leaf chermes has a 2 year life cycle and attacks on white pine shoots in the odd-numbered years have been characteristic of the insect in the Maritime Provinces in recent years. Infestations on white pine shoots were light in 1957 and little evidence of injury was apparent in 1958.

	Reports	Collections
New Brunswick	2	10
Nova Scotia	1	3

Red-pine Sawfly, *Neodiprion nanulus nanulus* Schedl—The infestation on young red pine trees at Acadia Forest Experiment Station was less severe than in 1957, but a number of trees were severely defoliated. Totals of 1,230 and 3,790 sawfly eggs were reared in 1957 and in 1958, respectively, but no egg parasites emerged.

In 1957, 90 trees were sprayed with a virus suspension by D. E. Elgee. His studies showed that the effect of the initial application was successful. The carry-over of the virus was disappointing, however, for few larvae collected from these trees in 1958 were diseased.

A few colonies of larvae were collected from red pine trees at Boiestown and Kirkwood, New Brunswick, but none were received from Nova Scotia or Prince Edward Island.

	Reports	Collections
New Brunswick	5	8

White-pine Sawfly, *Neodiprion pinetum* Nort.—Larvae, believed to be this species, were collected from a white pine tree near Tracadie, Prince Edward Island. It has been found only occasionally in the Maritime Provinces.

	Reports	Collections
Prince Edward Island	—	1

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)—Light to moderate attacks were observed on a few mugho pines in Fredericton. In Nova Scotia, the insect caused noticeable injury to a Scots pine hedge at Middleton, and was common on several mugho pines in Truro.

	Reports	Collections
New Brunswick	2	4
Nova Scotia	2	1

Pitch Nodule Maker, *Petrova albicapitana* (Busck)—Large numbers of pitch nodules caused by this insect were observed on lodgepole pine trees at the Acadia Forest Experiment Station and on jack pine trees at White's Cove, Queens County, New Brunswick. A few specimens were collected from jack pine trees at Blue Mountain and at Eden Lake, Pictou County, Nova Scotia.

	Reports	Collections
New Brunswick	2	2
Nova Scotia	—	2

Birch Casebearer, *Coleophora fuscedinella* (Zell.)—Damage to foliage of white birch and wire birch by the birch casebearer was light in most parts of New Brunswick. Severe attacks occurred in north-central York County, between Doaktown and Ludlow, Northumberland County, and in the Bathurst-Grand Anse area of Gloucester County. The least amount of browning occurred in the southern part of the Province.

The infestation reported in 1957 at Shulie River, Nova Scotia, has subsided. The severity of attacks on birch and alder along the shore of Minas Channel in Cumberland County was much reduced and ranged from light to moderate. On Cape Breton Island, from Cape North to Barachois River, the foliage of white birch trees and reproduction was often completely destroyed.

Moderate browning of wire birch foliage was observed at Cavendish and at Bedford Station in Prince Edward Island.

	Reports	Collections
New Brunswick	14	55
Nova Scotia	5	28
Prince Edward Island	2	1

Birch Leaf Miner, *Fenusa pusilla* (Lep.) and ***Birch Leaf-mining Sawfly,*** *Heterarthrus nemoratus* (Fall.)—Browning of white birch and wire birch foliage by the birch leaf miner was common in New Brunswick, except for St. John County and the northern part of Restigouche County where no damage was observed. The most severe infestations were along the Southwest Miramichi River Valley, where as much as 80 per cent of the foliage was destroyed, and in many areas through the Upper St. John River Valley.

Both species were widespread in Nova Scotia and were often found together. The birch leaf miner predominated. Attacks were more severe than in 1957 and browning of white and wire birch leaves was general. Infestations were most conspicuous between Hilden, Colchester County, and Enfield, Hants County, at Middleborough and Fountain Road, Cumberland County, and near New Glasgow.

The birch leaf miner was common in Prince Edward Island but damage was light.

	Reports	Collections
New Brunswick	7	19
Nova Scotia	6	13
Prince Edward Island	2	4

Satin Moth *Stilpnotia salicis* (L.)—Damage in New Brunswick was limited to severe defoliation of a few silver poplar trees at Woodstock and at Magnetic Hill, near Moncton, and light injury of silver poplar leaves at Coldstream and at Campbellton. On Cape Breton Island, satin moth larvae destroyed about 40 per cent of the foliage of silver poplars at Margaree Harbour and at Grand Etang; lighter attacks on the same host were observed at Cheticamp, Port Hood, and Little Bras D'or. Severe defoliation was observed on a few Carolina and silver poplar trees at St. Peters, Prince Edward Island.

	Reports	Collections
New Brunswick	6	4
Nova Scotia	3	7
Prince Edward Island	2	3

Beech Scale, *Cryptococcus fagi* (Baer.)—The known northern limits of beech scale infestation in New Brunswick were extended by the record of severe attacks along the Stewart Highway in Victoria County. Tallies of plot trees at Glenwood, Restigouche County, showed that 30 per cent of the stems were lightly infested in 1954 and 42 per cent in 1958. General observations in the Fredericton area indicated that infestations were more severe than for a number of years. Most of the mature trees were moderately attacked, some were severely infested and a number showed yellow foliage.

Little change occurred in the status of the beech scale in Nova Scotia or in Prince Edward Island, where most of the beech trees were cankered and supported light infestations.

	Reports	Collections
New Brunswick	9	3
Nova Scotia	5	—
Prince Edward Island	1	—

Winter Moth, *Operophtera brumata* (L.)—This European insect was found for the first time along the north shore of Minas Basin in Nova Scotia at Lower Debert and Upper Economy, Colchester County, and as far west as Brookville and East Frazerville, Cumberland County. In the Annapolis Valley, the known distribution of the insect was extended to the west by collections of specimens beyond Kentville to Berwick, Kings County and near Middleton and Paradise, Annapolis County.

Spotty but severe infestations on apple and red oak trees occurred along the coast from Port Joli, Queens County, to Echo Lake, Halifax County, and inland to include Waverley, Caledonia, New Germany, and Chester Grant. Severe attacks on these hosts were observed also from Grand Pré to Windsor and beyond St. Croix to Newport Corner.

The winter moth and fall cankerworm were found together in a number of locations (see fall cankerworm). Only the winter moth was found at Summerville, Queens County, at Timberlea and St. Margaret's Bay, Halifax County, and at Greenwich, Kings County, where both species were present in varying proportions in 1957.

Nematodes of the genus *Complexomermis* were reared from winter moth larvae collected at Oak Hill and Wentzell Lake, Lunenburg County, and Brooklyn, Queens County.

Small numbers of the following native parasites, identified by specialists of the Insect Systematics and Biological Control Unit Entomology Division, have been reared from winter moth larvae: *Apanteles nemoriae* Ashm., *Apanteles paleacritae* Riley, *Apanteles phlyctaeniae* Mues., *Apanteles acaudus* (Prov.), *Casinaria* sp. poss. *forcipata* Wall., *Pimpla tenuicornis* (Cress.), *Cratichneumon paratus* (Say) and *Phryxe pecosensis* Tns. The parasite, *Trichogramma minutum* Riley, was reared from winter moth eggs by D. G. Embree.

The program of releasing European parasites was continued in co-operation with the Entomology Division. Over 17,000 specimens of three parasites, *Agrypon flavcolatum* (Grav.), *Cyzenis albicans*, and *Phorocera obscura* Fall., were liberated at points in Halifax, Lunenburg, Queens, and Hants counties.

	Reports	Collections
Nova Scotia	18	111

Fall Cankerworm, *Alsophila pometaria* (Harr.)—This insect caused noticeable defoliation of white elm trees in New Brunswick along the Upper St. John River Valley from Hartland to Glazier Lake, and in Fredericton and St. Stephen. Small numbers of larvae were collected in the Newcastle-Chatham area, and at localities in Queens and Sunbury counties.

In Nova Scotia, severe defoliation by cankerworms occurred in unsprayed apple orchards in the Annapolis Valley at Berwick, Paradise, and from Bridgetown to Granville Ferry. Light infestations were reported on white elm trees at Bridgetown and Lawrencetown, and on apple trees near Cambridge, Kings County. In some of the locations where the fall cankerworm and winter moth were found together, the proportions of the former to the latter were as follows: Berwick, Kings County, 1:2; Mahone Bay, Lunenburg County, 1:9; Mill Village, Queens County, 1:49; Greenfield Road Junction, Queens County, 1:4; and Pleasant River, Queens County, 1:19.

Rearings of fall cankerworm eggs and larvae from 1956 to 1958 have produced the following parasites, new to the Survey in the Maritime Provinces: *Euplectrus mellipes* Prov., *Telenomus alsophilae* Vier., *Eulophus orgyiae* (Fitch), *Eulophus pallipes* (Prov.), *Tachinomyia nigricans* (Webb.), and *Phrynolydella eufitchiae* (Tns.).

	Reports	Collections
New Brunswick	2	21
Nova Scotia	4	20
Prince Edward Island	1	6

Ugly-nest Caterpillar, *Archips cerasivoranus* (Fitch)—Webs of this caterpillar were common on choke cherry and black cherry bushes on roadsides and in hedgerows in all Maritime Provinces. In New Brunswick, these webs were most numerous in the following areas: Chatham and Sunny Corner, Northumberland County; Kirkland, Carleton County; Scotch Lake and Douglas, York County; near French Lake, Sunbury County; and from Moores Mills to St. Stephen to Oak Bay, Charlotte County.

In Nova Scotia, webs were especially noticeable in parts of central Pictou County; at Stewiacke, Colchester County; and at Shubenacadie and Milford, Hants County.

Nests were observed throughout Prince Edward Island, but in small numbers.

	Reports	Collections
New Brunswick	20	34
Nova Scotia	4	18
Prince Edward Island	3	6

Fall Webworm, *Hyphantria cunea* (Drury)—Contrary to the prediction made in this report a year ago, the webworm decreased in abundance throughout the Maritime Provinces in 1958. In New Brunswick and Nova Scotia, the number of nests per mile was less than one-half the number recorded in the same areas in 1957. Population levels continued to be highest in the southeastern tip of New Brunswick and in Nova Scotia where nests averaged about 30 per mile in 1958; in the rest of New Brunswick there was only about one nest per mile. Parasitism of this species was about 25 per cent in 1957, so the decrease in abundance suggests either that this degree of parasitism is capable of reversing a rising population trend, or that weather conditions were particularly unfavorable during the winter and spring. This question will be resolved by studying population and parasite records during the next few years.

	Reports	Collections
New Brunswick	5	7
Nova Scotia	3	48
Prince Edward Island	2	3

Native Elm Bark Beetle, *Hylurgopinus rufipes* (Eich.)—Examinations of a number of white elm trees killed by the Dutch elm disease in the Woodstock area, New Brunswick, showed that all were infested with this beetle. Previously the insect had been recorded in New Brunswick from DeWolfe, Charlotte County, Hartland and Fredericton.

	Reports	Collections
New Brunswick	1	3

White-marked Tussock Moth, *Hemerocampa leucostigma* (J. E. Smith)—The severe infestations reported in Nova Scotia in 1956 and in 1957 have completely subsided. A polyhedral virus was the key factor in controlling these outbreaks, but parasites also played a part in reducing insect numbers.

	Reports	Collections
New Brunswick	—	3
Nova Scotia	3	3

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)—Defoliation of American and European mountain-ash trees was generally light to moderate, but occasionally severe throughout the Maritime Provinces. Severely defoliated ornamentals were observed at Fredericton, Millerton, and Newcastle in New Brunswick, and at Truro, Nova Scotia. Some refoliation of such trees was observed in Fredericton in August.

	Reports	Collections
New Brunswick	6	14
Nova Scotia	3	11
Prince Edward Island	1	1

Basswood Looper, *Erannis tiliaria* (Harr.)—Numbers of this insect remained low throughout the Maritime Provinces.

	Reports	Collections
New Brunswick	—	3
Nova Scotia	1	3
Prince Edward Island	—	4

Striped Alder Sawfly, *Hemichroa crocea* (Fourc.)—A local outbreak occurred at South West Mabou, Inverness County, Nova Scotia, where the leaves of alder bushes were almost completely destroyed.

	Reports	Collections
Nova Scotia	1	1

NEWFOUNDLAND

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)—This species continued to be the most serious forest insect problem. Population levels were generally low and the only extension of the area infested occurred in western Newfoundland where 'gouty' trees were observed for the first time at the junction of the Lomond and Cormack roads, about 10 miles north of Deer Lake. Spot infestations also were reported for the first time at Black Head, Seal Cove, and North Head, Bay of Islands. The status of infestations by districts was as follows:

St. Barbe: Small numbers persisted on a few trees at Trout River. Most of the infested trees reported in 1956 have been cut by the owner.

Humber: Severe injury occurred in the Lower Serpentine River Valley where the estimated mortality of balsam fir trees was 40 to 60 per cent. The old infestations persisted along the shores of Humber Arm. Additional spot infestations, ranging from light to severe, were detected from the air near Black Head, Seal Cove, and North Head, Bay of Islands. Recently infested trees were common throughout much of the area from Corner Brook to Deer Lake. Light to moderate 'stem attack' was reported at Wild Cove, Steady Brook, and Gillams.

St. George's: Injury has been especially severe throughout this District, particularly in the lowlands, in the river valleys, and along the coast. However, signs of recovery appeared in some localities. In the Robinsons River watershed, and between Black Duck and Stephenville Crossing, about 70 per cent of the balsam fir trees showed from one to two years of shoot recovery. In many instances small swellings on these shoots indicated that the insect is still present although not numerous enough to inhibit shoot growth. Recovery may not prove to be permanent.

Burin: An infestation extends from Marystown to Epworth and west to Garnish. Numbers of this insect were low and two to three years of foliage recovery was recorded. A small area of light 'stem attack' was observed near Winterland.

Avalon: The size and intensity of the infestation in the St. John's area have been reduced. Light 'gout' occurred at Torbay and Donovans and only four gouty trees were seen in the Bowring Park area, where the infestation was severe in 1949 and in 1950.

Population levels of this insect in 1957 and 1958 have been the lowest since 1950. Mortality, caused by extremely low temperatures in the winter of 1957, was undoubtedly the most important factor contributing to this reduction in numbers. However, the cutting and removing of infested trees, practised in several areas over the past few years, has been helpful in reducing numbers and preventing infestations from spreading.

The introduction of European insect predators was intensified and four species were released from 12 shipments. One species, *Aphidoletes thompsoni* Möhn. was liberated in Newfoundland for the first time. Studies in New Brunswick indicate that *A. thompsoni* has characteristics that suggest it may be of value against the lighter infestations causing 'gout' that are characteristic of Newfoundland.

Reports	Collections
5	20

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—Despite intensive sampling in many parts of the Province, only 403 budworm specimens were collected, all in the districts of St. George's and St. Barbe. No defoliation was observed. Egg sampling indicated that population levels will remain low in 1959.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
5	60	2.2	+0.1

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Gn.)—This species was more common in 1958 in some eastern and central parts of the Province than in 1957. Specimens received at the laboratory totalled 121 compared with 23 in 1957. No defoliation was reported from any location. Susceptible stands of balsam fir will be watched carefully during the next few years for any further increases of this important pest.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
2	47	1.0	0.0

Balsam-fir Sawfly, *Neodiprion abietis* complex—Numbers continued to decrease and defoliation was negligible. Colonies of larvae were observed on open-grown immature balsam fir trees in the Gallants and George's Lake areas, and near Hine's Road, along the Grand Lake Road, and near Stray Pond. This is the same general area where severe outbreaks occurred in 1954 and in 1955.

Reports	Collections
4	165

Black-headed Budworm, *Acleris variana* (Fern.)—Numbers of this species remained low, but the insect was slightly more common than in 1957 in the Avalon and Burin peninsulas. Thirty-five collections were made compared with nine in 1957.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
2	35	0.8	−0.4

European Spruce Sawfly, *Diprion hercyniae* (Htg.)—A total of 214 specimens was collected compared with 178 in 1957. The largest collections originated in the Grand Falls, Gander, and Green Bay areas. Several specimens showed the symptoms of a virus disease when collected and mortality of larvae in the insectary from disease was almost 50 per cent indicating that the introduced virus is still a valuable control factor.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
5	68	1.3	+0.2

Bark Beetles—Aerial observations showed that overmature white spruce trees, apparently killed by the eastern spruce bark beetle, *Dendroctonus piceaperda* Hopk., were conspicuous in the Serpentine Valley and at Goose Arm.

During investigations on a root rot of young black spruce trees, at least three species of bark beetles were found on dead and injured trees; only one, *Scolytus piceae* (Sw.), has been identified.

Reports	Collections
2	1

Yellow-headed Spruce Sawfly, *Pikonema alaskensis* (Roh.)—Scattered infestations occurred on young black spruce trees at Terra Nova, Adies Lake, Cormack, and Halls Bay. Noticeable injury was confined to isolated trees and less than 1 per cent of the stands was affected. Defoliation generally ranged from 10 to 20 per cent, but in each area a few trees were severely defoliated.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
3	62	6.2	+4.5

Spruce Budmoth, *Zeiraphera ratzeburgiana* Ratz.—Light infestations occurred on white spruce trees on the Avalon Peninsula and in St. Barbe and St. George's districts. In the former area, about 10 per cent of the new shoots were destroyed; in the latter districts, only a trace of defoliation was observed.

Reports	Collections
3	47

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—Moderate to severe outbreaks continued in sections of the Terra Nova, Badger-Buchans, and Millertown areas. In western Newfoundland population levels were high near Flat Bay Brook and St. George's, and defoliation of tamarack trees ranged from 40 to 90 per cent. Near Stephenville Crossing and Black Duck, numbers were lower and defoliation was no higher than 20 per cent.

Larch sawfly defoliation over the past 3 years has killed about 10 per cent of the tamarack trees in the Swift Current and Arnold Cove areas of the Avalon Peninsula.

		Larvae per tree sample	
Reports	Collections	Av.	Dev. from 1957
5	70	37.4	+29.1

Larch Casebearer, *Coleophora laricella* (Hbn.)—Numbers were generally low in all areas. Slight browning of tamarack foliage by the casebearer was observed in the Deer Lake region.

Reports	Collections
2	17

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)—This species was reported only from the St. John's area where it continued to injure ornamental red pine trees.

Reports
1

Satin Moth, *Stilpnotia salicis* (L.)—Infestations persisted on Lombardy poplars in the town of Deer Lake. Larval collections from ornamental poplars and reports of defoliation were received from Gambo, Port Blandford, and Bonavista. No defoliation of forest stands of aspen was reported.

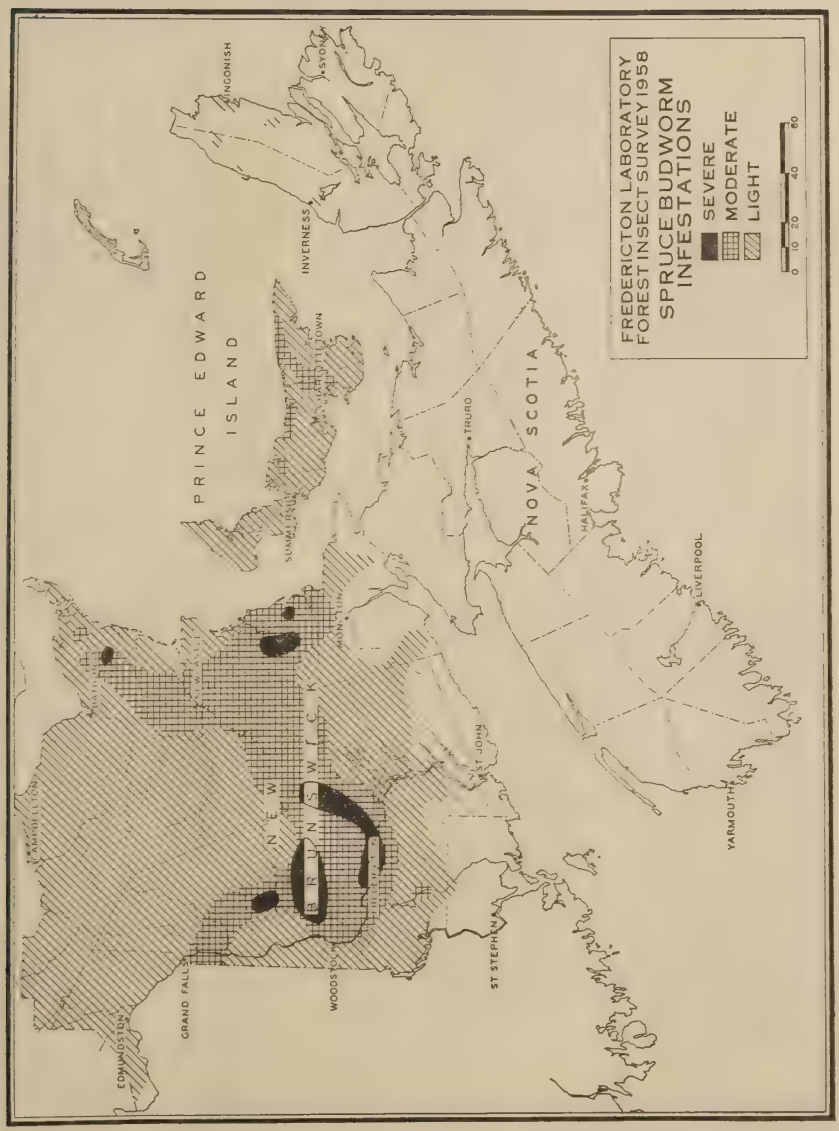
Reports	Collections
2	11

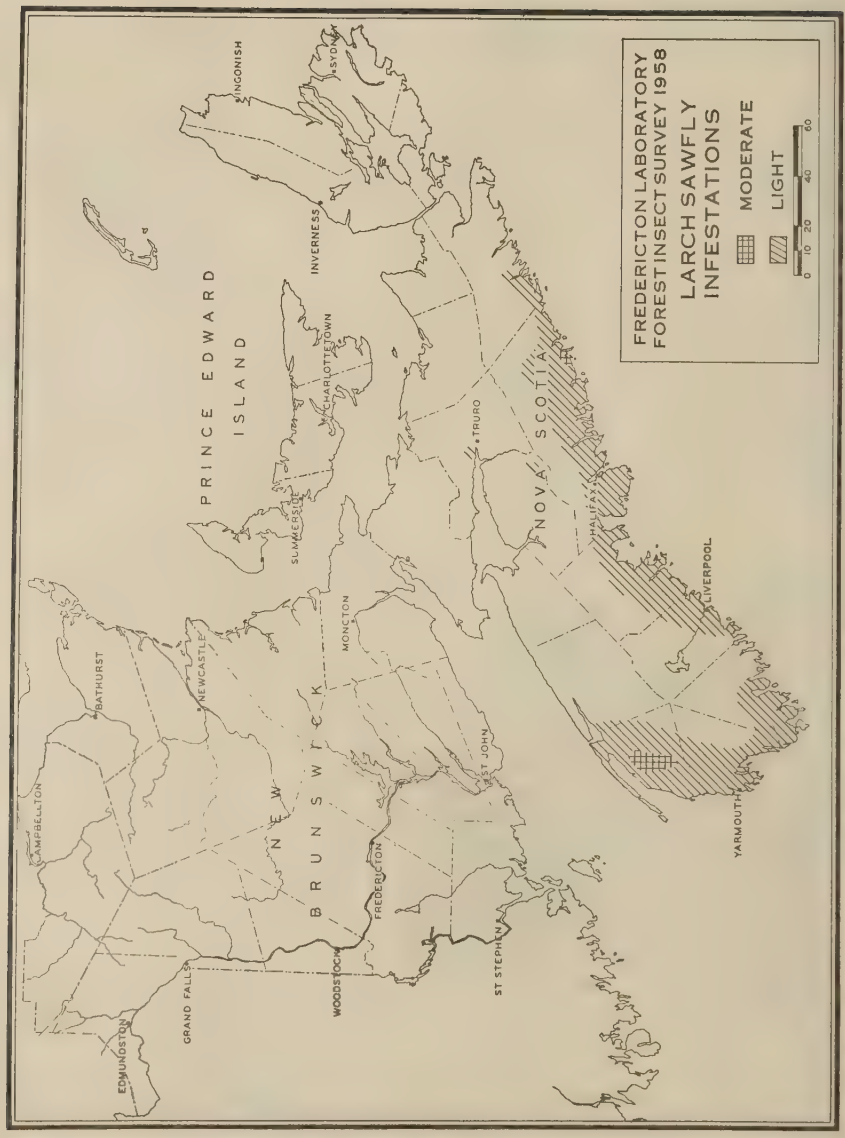
Poplar Leaf Roller, *Anacampsis innocuella* Zell.—This insect caused defoliation of ornamental poplars and natural aspen stands in some parts of the central and eastern districts, particularly at Glenwood and Glovertown.

Reports	Collections
3	16

Mountain-ash Sawfly *Pristiphora geniculata* (Htg.)—Larvae were observed on mountain ash trees in all sections of the Province, except the Northern Peninsula. The sawfly was collected for the first time by the Survey on the Avalon Peninsula, near St. John's.

Reports	Collections
2	8


FREDERICTON LABORATORY
FOREST INSECT SURVEY 1958
SPRUCE BUDWORM
INFESTATIONS
SEVERE
MODERATE
LIGHT
0 10 20 40 60
PRINCE EDWARD
ISLAND
NOVA SCOTIA
NEW BRUNSWICK
INVERNESS
SUMMERSIDE
CHARLOTTETOWN
TRURO
HALIFAX
LIVERPOOL
YARMOUTH
ST JOHN
ST STEPHEN
GRAND FALLS
EDMUNDSTON
WOODSTOCK


FREDERICTON LABORATORY
FOREST INSECT SURVEY 1958
LARCH SAWFLY
INFESTATIONS
MODERATE
LIGHT
0 10 20 40 60
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NOVA SCOTIA
CAMPBELLTON
BATHURST
NEWCASTLE
MONCTON
SUMMERSIDE
CHARLOTTETOWN
INVERNESS
SYDNEY
INGONISH
TRURO
HALIFAX
LIVERPOOL
YARMOUTH
SAINT JOHN
FREDERICTON
WOODSTOCK
ST STEPHEN
GRAND FALLS
EDMUNDSTON

ATLANTIC PROVINCES

FOREST DISEASE SURVEY

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INTRODUCTION

Adverse weather conditions were directly responsible for damage to forest trees in the Atlantic Provinces during 1958, but the resulting injury was not as severe as that caused in 1956. Freezing rains caused damage in Newfoundland, New Brunswick, and Nova Scotia; injury from late frosts occurred in all four Provinces. Hurricane Helene passed along the coasts of Nova Scotia and Newfoundland in late September but damage was confined largely to shade trees in southern Nova Scotia, Cape Breton Island, and western Newfoundland.

Mean temperatures recorded during late spring and early summer were generally lower than normal. Precipitation was variable and both excesses and deficiencies were recorded. These conditions were generally more favorable for the development of foliage diseases than those that prevailed in 1957. Considerable variation in the intensity of these diseases, however, occurred both between diseases and between localities.

An intensive survey conducted by the Forest Biology and Plant Protection divisions showed that the Dutch elm disease, first discovered in New Brunswick in 1957, was firmly established.

In a further attempt to reduce the number of collections of common and easily diagnosed diseases handled in the laboratory, the Survey staff submitted reports on these diseases rather than samples each time they were encountered. As a result, the number of collections was reduced to 274, 100 less than in 1957. An additional 150 samples from trees suspected of having Dutch elm disease were submitted to Dr. René Pomerleau, Forest Biology Laboratory, Quebec, for identification. A number of samples collected to determine the fungi causing decay in storm-damaged trees and root rot of spruce are not included in the total.

As in past years, members of the Mycology Unit, Botany and Plant Pathology Division, Ottawa, assisted with the identification of some of the fungi collected.

IMPORTANT DISEASES

Ice Storm Damage—The areas affected were not so extensive as in 1956 nor was the injury as severe. In Newfoundland, the severest damage occurred on the Avalon Peninsula, particularly near St. John's. In New Brunswick, broken tops were noticeable in an area northwest of Newcastle, Northumberland County; near Napadogan, York County; in the Richibucto–Rexton area, Kent County; in western Charlotte County; and in the Elgin area, Albert County. In Nova Scotia, injury was observed only in the Little Bras d'Or and Millville areas, Cape Breton County.

During 1958, isolations were made to determine the fungi present in broken tops, caused by the 1956 ice storm, in a number of the smaller trees of different species. A complete report is not yet available, but *Stereum sanguinolenthum* Alb. & Schw. ex Fr. appears to be the fungus most commonly established in the tops of balsam fir, black spruce, larch, and jack pine. In balsam fir and black

spruce, decay caused by this fungus extended into the trees an average of 1.1 ft. and 1.6 ft. respectively. *Stereum purpureum* (Pers.) Fr. and *Polyporus zonatus* Fr. have been identified most commonly from trembling aspen.

Frost Damage—Late frost damage to the current year's growth of balsam fir and spruce was observed in all four Provinces. Seedlings and young trees growing in valleys and open stands suffered the most. In Newfoundland, injury was common in the Triton Brook area, the St. John's area, and on the Bay Bulls road. Damage was widespread in the northern half of New Brunswick but scattered in Kings, Westmorland, and Kent counties, and throughout most of Nova Scotia. In Prince Edward Island, damage was noted at localities in Queens and Kings counties.

Dutch Elm Disease—During 1958, *Ceratocystis ulmi* (Buism.) C. Moreau, the causal fungus of Dutch elm disease, was isolated from 110 of the 150 samples submitted to the Quebec Laboratory for culturing. As shown by the accompanying map, diseased trees occurred in 14 localities in three counties of New Brunswick. Although no attempt was made to locate all diseased trees in the more heavily infected localities, the infected trees sampled were located as follows:

Carleton County		Victoria County	
Bloomfield	1	Aroostook	1
Grafton	33	Lower Aroostook	9
Lower Woodstock	13	Tobique Narrows	5
Newburg Jct	5		
Northampton	2	Total	15
Simonds	1		
Upper Northampton	8	York County	
Upper Woodstock	3	Kingsclear	1
Woodstock	26	Temperance Vale	2
Total	92	Total	3

Six isolates of *Cephalosporium* sp. and three of *Verticillium* sp. were also obtained from diseased trees. The locations of trees infected with these fungi are given under "Other Noteworthy Diseases".

Willow Blight—Damage from willow blight, *Fusicladium saliciperdum* (All. & Tub.) Lind. and *Physalospora miyabeana* Fuk., was heavy throughout New Brunswick wherever willows occurred, especially along the St. John River. The disease was observed throughout most of Nova Scotia but the heaviest attacks were in the Annapolis Valley and in the Bridgewater area. At these locations, however, the disease did not appear to be as severe as along the St. John River.

Willow blight has never been observed by the Survey in Newfoundland but it is of interest to note that a collection of *Fusicladium saliciperdum*, made by J. H. Hockey at Whitbourne in 1949, is deposited in the herbarium of the Mycology Unit, Botany and Plant Pathology Division, Ottawa.

Ink Spot of Aspen—The browning of trembling aspen leaves caused by *Ciborinia whetzelii* (Seav.) Seav. was very noticeable in most counties of New Brunswick, but was light and scattered in Nova Scotia. Young trees up to 5 inches in diameter were most severely affected. The heaviest damage observed in New Brunswick was at Flowers Brook, Queens County, where 50 to 75 per cent of the foliage was affected. The heaviest infection recorded in Nova Scotia was in the Chignecto Game Sanctuary, Cumberland County, where 25 per cent of the leaves were attacked.

Ash Rust—Ash rust caused by *Puccinia sparganioides* Ell. & Barth. was generally light in the Maritime Provinces. In New Brunswick, however, the disease was responsible for considerable defoliation of white ash along the St.

John River between Sheffield, Sunbury County, and Jemseg, Queens County. This was the first time extensive defoliation by ash rust had been observed inland in New Brunswick by the Survey. In Nova Scotia, the heaviest infections encountered were again along the south shore of Queens County.

Leaf and Twig Blight of Poplar—Leaf and twig blight, *Fusicladium radiosum* (Lib.) Lind., was widespread throughout western Nova Scotia and collections were submitted from locations in eastern Nova Scotia, Newfoundland, and New Brunswick. This disease affected young aspen trees and the damage was generally light.

Cherry Blight—Blighted pin cherry shoots, probably caused by a bacterium, were observed in all parts of the Maritime Provinces but the intensity of the blighting varied considerably. One collection believed to be of this disease was made in Newfoundland.

Needle Cast of Spruce—In 1957 reference was made to a report that dying of large branches on mature and second growth red spruce trees was widespread in Yarmouth and Digby counties, N.S. During 1958 this report was investigated but no abnormal branch mortality was observed. However, a considerable number of the 1957 needles on many of the trees examined were reddish-brown suggesting attack by a needle cast fungus, although no fruiting bodies were observed. A similar condition was observed on red spruce in central New Brunswick and on black spruce in western and central Newfoundland.

Tip Blight of Balsam Fir—Tip blight of balsam fir caused by *Rehmiellopsis balsameae* Waterman was observed in Richmond County, N.S. The disease was common in the St. Peters, Lynch River, and Grand River areas; at Barrahead as much as 70 per cent of the current foliage was killed on some trees.

Black Knot of Cherry—Black knots, resulting from attack by *Dibotryon morbosum* (Schw.) T. & S., were common at localities in York, Charlotte, St. John, Kings, Northumberland, Restigouche, and Albert counties, N.B. In western Nova Scotia, the disease was also common but the most numerous infections were recorded in southern Lunenburg County. In eastern Nova Scotia, heavy infections were observed in Pictou and Victoria counties. Pin cherry appeared to have suffered the most damage.

Armillaria Root Rot—Several reports were received that black spruce regeneration in burned-over areas of Newfoundland appeared sickly with some mortality occurring. M. A. Stillwell and R. H. Cochrane investigated this condition and reported that root rot caused by *Armillaria mellea* (Vahl ex Fr.) Quél. was associated with the disease. Most of the affected trees had been attacked by bark beetles as well and further detailed studies will be necessary before the contributing factors can be determined.

White-pine Resinosis—This disease of unknown cause, characterized by a resin flow from cankers in the bark, was observed in all white pine stands examined in the Maritime Provinces. The cankers were for the most part not numerous and did not appear to be causing serious damage.

Spruce Needle Rusts—Needle rusts, caused by either *Chrysomyxa ledi* de Bary or *C. ledicola* Lagerh., were heavy on the current year's foliage of spruce in localized areas of all four Provinces.

Red Flag of Balsam Fir—Red branch tips on balsam fir were very common in parts of Cape Breton Island. It is believed that cankers caused by *Fusicoccum abietinum* Prill. & Delacr. were responsible for at least some of the flags.

Elm Leaf Spots—Damage from elm leaf spots was generally light during 1958. Considerable defoliation caused by *Gnomonia ulmea* (Schw.) Thüm. however, occurred at Sheffield, N.B. This fungus was responsible also for light defoliation of a small number of trees at Millertown, Northumberland County, and Fredericton.

Phleospora ulmi (Fr.) Wallr., the imperfect stage of *Mycosphaerella ulmi* Kleb., was responsible for considerable browning and some defoliation of the elms in Liverpool, N.S. during late summer.

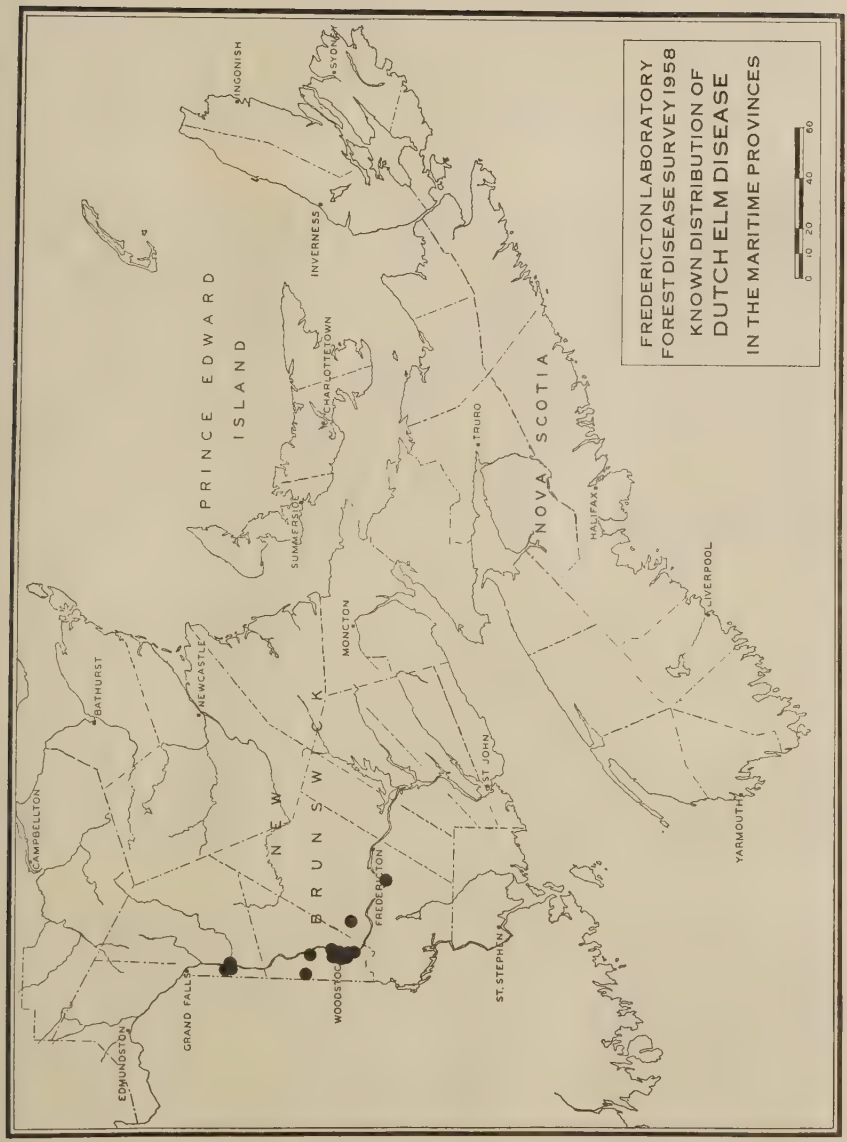
Leaf Blotch of Horsechestnut and Anthracnose of Maple—These diseases, caused by *Guignardia aesculi* (Pk.) Stew. and *Gloeosporium apocryptum* Ell. & Ev. respectively, were responsible for considerable browning of the leaves of their hosts in towns in western Nova Scotia. Occasional severely infected trees were noted elsewhere in the Maritime Provinces.

Oak Leaf Blister—*Taphrina caerulescens* (Mont. & Desm.) Tul. caused very little damage during 1958. The most numerous infections were observed on red oak in the Grand Lake area, Queens County, N.B.

Miscellaneous Diseases of Unknown Cause—Dead and dying twigs and branches of tamarack were reported to be common throughout most of eastern Nova Scotia. Additional collections of the disorder were made at localities in western Nova Scotia and Prince Edward Island. Early in August, the leaves on many white and yellow birch trees were reported to be drying out and curling. The causes of these disorders are not known and will be investigated during 1959.

OTHER NOTEWORTHY DISEASES

Host	Organism	Locality	Remarks
Ash	*Cylindrosporium fraxini* (Ell. & Kell.) Ell. & Ev.	Camperdown, N.S.	Causes a leaf spot. First record for district.
Birch, white	*Cylindrosporium betulae* J. J. Davis.	Rogers Siding, N.B.	Causes a leaf spot. First record for district.
Birch, white	*Gloeosporium betulicola* Sacc. & Holw.	Rothesay, N.B.	Causes a leaf anthracnose. First record for district.
Cherry, choke	*Taphrina confusa* (Atk.) Gies.	Den Brook, N.B.	Causes a leaf blister. First herbarium record.
Elm	*Cephalosporium* sp.	Belleville, Lower Bloomfield, & Marysville, N.B.	Causes a wilt disease. First survey record.
Elm	*Verticillium* sp.	Newburg Jct., Doaktown, and Woodstock, N.B.	Causes a wilt disease. First survey record.
Maple, red	*Valsa ambiens* Pers. ex Fr.	Fraser-Burchill Rd., N.B.	Associated with cankers. First record for district.
Maple, sugar	*Gloeosporium decolorans* Ell. & Ev.	Rocky Brook, N.B.	Causes a leaf anthracnose. First record for district.
Spruce, black	*Bifusella crepidiformis* Darker	Deer Lake, Nfld.	Causes a needle cast. Has been considered a weak parasite. First record for district.


FREDERICTON LABORATORY
FOREST DISEASE SURVEY 1958
KNOWN DISTRIBUTION OF
DUTCH ELM DISEASE
IN THE MARITIME PROVINCES
0 10 20 40 60
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NOVA SCOTIA
CAMPBELLTON
BATHURST
NEWCASTLE
MONCTON
SUMMERSIDE
CHARLOTTETOWN
INVERNESS
SYDNEY
PINGONISH
TRURO
HALIFAX
LIVERPOOL
YARMOUTH
ST. JOHN
ST. STEPHEN
FREDERICTON
WOODSTOCK
GRAND FALLS
EDMUNDSTON

PROVINCE OF QUEBEC

FOREST INSECT SURVEY

R. MARTINEAU

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INTRODUCTION

No changes were made in the general arrangements which have prevailed since 1955 for the Forest Insect Survey in Quebec, and again in 1958 the Survey was limited to problems of particular interest. The spruce budworm and the Swaine jack-pine sawfly were again the two insects of major importance while the larch sawfly attracted more attention than in former years. Ground surveys of the spruce budworm were conducted with the same intensity as in previous years in the Lower St. Lawrence and Gaspé regions. The aerial survey was reduced to 17 hours of flying compared with 71 in 1957, because of the more uniform conditions brought about by the marked reductions in population level. In previous years a general survey was made of all jack pine areas, but in 1957 the survey for jack pine sawflies was restricted to Settrington Township, Charlevoix County. The other information presented in this Report was obtained from observations connected with the various projects of the Laboratory. Several insect species were recorded this year by the Forest Insect Survey in Quebec for the first time. They were as follows:

Species	Host
Argyresthia laricella Kft.	European larch
Exartema appendiceum Zell.	Sugar maple
Proteoteras moffatiana Fern.	Sugar maple
Argyrotoza semipurpurana Kft.	Red oak
Acrocercops striginifitella Clem.	Red oak
Bucculatrix ainsliella Murtf.	Red oak
Phytagromyza populicola (Hal.)	Poplars
Eriocampa ovata (Linn.)	Speckled alder

The co-operation received from the Quebec Forest Industries Association Limited in connection with the spruce budworm egg survey in the Gaspé Peninsula is gratefully acknowledged.

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—The spruce budworm has been a serious pest of the spruce-fir forests of Quebec since the first signs of an infestation were reported in Abitibi-Ouest County in 1939. The outbreak has progressed eastward each year and all regions have suffered severe damage from the Ontario border to the Gaspé Peninsula where the insect has been most active in recent years. Extensive aerial spraying started in the Lower St. Lawrence and Gaspé regions in 1954 and, since then, millions of acres of balsam fir forest have been sprayed with most satisfactory results. Significant population reductions largely attributable to unfavourable weather conditions were recorded during the past 2 years. In 1957, surveys showed reduced abundance almost everywhere except for southeastern Bonaventure and Gaspé-Sud counties where high population levels were expected in 1958. Larval counts

made early in 1958 showed that the population level was slightly lower than expected and later checks showed a further reduction which, combined with spraying, resulted in much lighter damage than in previous years. In effect, only light defoliation was recorded in 1958 compared to large areas of medium and severe defoliation in previous years. The gradual decrease in abundance is well shown by the records of the egg survey made each fall. According to those records, 61 per cent of the localities were classified as severely infested in 1956, 30 per cent in 1957, and none in 1958. Only 9 per cent of the localities sampled in 1958 contained new budworm egg masses and only small numbers were found. It is evident that the insect will not be abundant in 1959 and no spraying is contemplated.

Jack-pine Sawflies, *Neodiprion* spp.—The special survey of jack pine stands was discontinued in 1958 and only occasional observations were made on *Neodiprion swainei* Midd. An increase in the numbers of this insect was noticed in the lower section of the St. Maurice watershed and in the infestation centres in Tremblay and Falardeau townships, Chicoutimi County. In the Clova area conditions were comparable to 1957.

In contrast, a significant decrease in population level was recorded in the moderate infestation of *Neodiprion virginianus* complex in Settrington Township, Charlevoix County, reported in 1957. Larvae collected in 1957 were heavily parasitized by *Diplostichus hamatus* (Ald.) and *Spathimeigenia* sp.

A few specimens of *Neodiprion compar* (Leach) were collected in the same area.

European Spruce Sawfly, *Diprion hercyniae* (Htg.)—A slight increase in the numbers of this insect was noted in 1958 in the Quebec–Three Rivers–Megantic area which has been surveyed each year since 1955. Sawflies were present on 87 per cent of the 377 white spruce trees sampled. This compares closely with data obtained in 1957.

Again in 1958, diseased specimens were collected from the six localities investigated and mortality from the virus disease was about the same as in 1957. Parasitism was generally low, but in addition to *Drino bohemica* Mesn. a few specimens of *Amblymerus verditer* (Nort.) were obtained in 1958.

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)—Observations were restricted to the Quebec City area in 1958. The cold weather during the winter of 1956-57 had much reduced the population level, but the survivors were favoured by mild weather the following winter and appreciable numbers of eggs were laid in 1958. If conditions are favourable during the winter 1958-59, there will be increased numbers of shoot moths in 1959.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—Tamarack trees were sampled in the Abitibi district, the Eastern Tonwships, Quebec City and vicinity, and in Laurentide Park. Relatively severe infestations were again recorded in western Quebec, where trees are in a very weakened condition from previous attacks. The larch sawfly is increasing in abundance around Quebec City and reports were received of severe infestations in the Rimouski, Lake St. John, and Clova areas.

Larch Casebearer, *Coleophora laricella* (Hbn.)—Surveys for this insect were made in the same areas as for the larch sawfly. The insect was found as far north as Mont Laurier, Labelle County, and was common in all other areas sampled except in Laurentide Park. Only light infestations were recorded.

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.)—Only small numbers of hemlock looper larvae were observed near the Vachon and May

Islands rivers on the North Shore of the St. Lawrence River in 1958. A few foliage samples taken from balsam fir in the Grande Vallée River watershed, in Gaspé-Nord County, where an outbreak of this insect occurred 10 years ago, showed that larvae were a little more common than usual.

Fall Cankerworm, *Alsophila pometaria* (Harr.)—Light to moderate defoliation was caused by several species of loopers in a small stand of red and sugar maples near St. Valier, Bellechasse County, in 1957. Over 80 per cent of the larvae were fall cankerworms but at least four other geometrids were also responsible for the damage. The four other species already identified are as follows: *Itame pustularia* Gn., *Erannis tiliaria* (Harr.), *Protoboarmia porcelaria* Gn., and *Ennomos subsigniarius* Hbn.

Fall cankerworm adults were also collected in the fall of 1958 on red oaks at Ste. Foy and Cap Rouge, near Quebec City.

A Twig Borer on Maple, *Exartema appendiceum* Zell.—This twig borer was reported causing damage in a sugar maple woodlot at Ste. Foy, Quebec in the spring of 1958. Observations made during the summer revealed that the insect was present in other areas near Quebec City. Rearings showed that another insect, identified as *Proteoteras moffatiana* Fern., was associated with the above species and partly responsible for the damage.

Poplar Sawfly, *Trichiocampus viminalis* (Fall.)—The poplar sawfly was quite abundant on ornamental Lombardy poplars in Quebec City in 1956, and it was later found on balsam poplar and cottonwood as well. However, numbers declined in 1957 due to a virus disease. Observations in 1958 showed that the population level remains low and that the virus disease was still present.

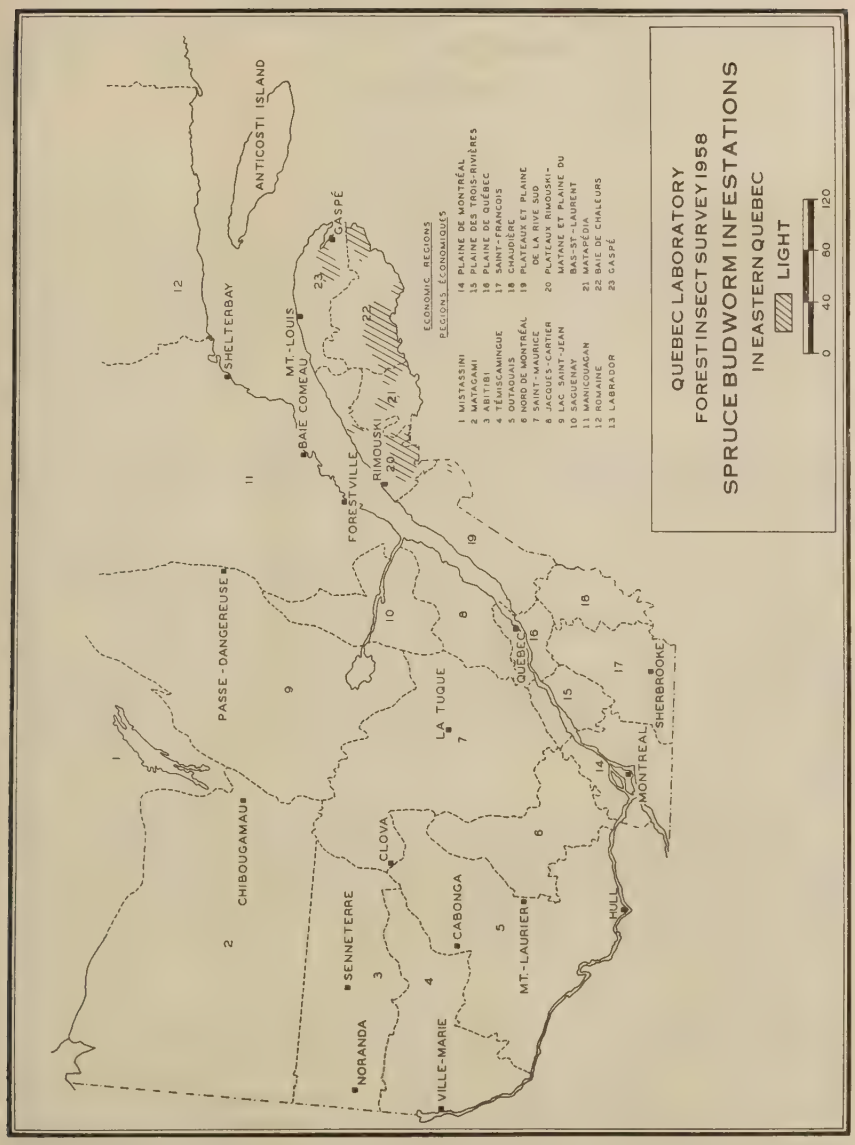
Satin Moth, *Stilpnotia salicis* (L.)—The occurrence of the satin moth was reported on ornamental poplars in the cities of Quebec and Ste. Foy during the summer 1958. Only small numbers were found and light defoliation recorded.

Poplar Leaf Miner, *Phytagromyza populicola* (Hal.)—This dipterous species of European origin was first found in Quebec City in August 1956 on Lombardy poplars. The insect has since been reported as quite abundant and has been found on *Populus tremuloides*, *P. grandidentata*, and *P. deltoides* in several cities in Quebec, namely, Hull, Montreal, Sherbrooke, Three Rivers, and Ste. Anne des Monts (Gaspé-Nord County).

A Leaf Roller on Oak, *Argyrotoza semipurpurana* Kft.—In 1957, medium to severe defoliation was noted early in the summer in a mature red oak stand on the campus of Laval University. Damage was also observed in a similar stand and on younger trees near Cap Rouge. In addition to this species another of secondary importance was recorded and identified as *Acrocercops strigini-fitella* Clem. Later in the same season the stands were damaged by the oak skeletonizer, *Bucculatrix ainsliella* Murtf. All three species were less abundant in 1958.

A European Alder Sawfly, *Eriocampa ovata* (Linn.)—A small infestation of this alder sawfly was found on alder at St. Augustin, Portneuf County, in the fall 1957. The insect was quite abundant in the same locality again in 1958. It was also collected in small numbers from the same tree species in nearby localities.

Larch Shoot Moth, *Argyresthia laricella* Kft.—Special surveys were made during the spring to ascertain whether this species occurred on European larch in Quebec. A few cities were visited and the insect was found at Ste. Anne de Bellevue, Berthierville, and in Lachute.


QUEBEC LABORATORY
FOREST INSECT SURVEY 1958
SPRUCE BUDWORM INFESTATIONS
IN EASTERN QUEBEC
LIGHT
0 40 80 120
ECONOMIC REGIONS
RÉGIONS ÉCONOMIQUES
1 MISTASSINI
2 MATAGAMI
3 ABITIBI
4 TÉMISCAMINGUE
5 OUTAOUAIS
6 NORD DE MONTRÉAL
7 SAINT-MAURICE
8 JACQUES-CARTIER
9 LAC SAINT-JEAN
10 SAGUENAY
11 MANICOUAGAN
12 ROUAINE
13 LABRADOR
14 PLAINE DE MONTRÉAL
15 PLAINE DES TROIS-RIVIÈRES
16 PLAINE DE QUÉBEC
17 SAINT-FRANÇOIS
18 CHAUDIÈRE
19 PLATEAUX ET PLAINE DE LA RIVE SUD
20 PLATEAUX RIMOUSKI-MATANE ET PLAINE DU BAS-ST-LAURENT
21 MATAPÉDIA
22 BAIE DE CHALEURS
23 GASPÉ
SHELTERBAY
ANTICOSTI ISLAND
MT.-LOUIS
BAIE COMEAU
GASPÉ
FORESTVILLE
RIMOUSKI
PASSE-DANGEREUSE
CHIBOUGAMAU
SENNETERRE
CLOVA
LA TUQUE
QUÉBEC
NORANDA
CABONGA
MT.-LAURIER
HULL
MONTRÉAL
SHERBROOKE
VILLE-MARIE

67980-3—3

PROVINCE OF QUEBEC

FOREST DISEASE SURVEY

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INTRODUCTION

The 1958 season in Quebec was particularly favourable to tree growth. From the end of winter to late fall the weather was rather cool and rainfall abundant. Except for trees previously affected, no example of winter drought injury was noticed. On the other hand, a number of foliage diseases were somewhat more pronounced, particularly on aspens, maples, elms, ashes, and willows. These diseases were seldom fatal to the trees. As in previous years, only a small number of disease samples, collected mostly by the laboratory staff, were handled during 1958.

IMPORTANT DISEASES

Dutch Elm Disease—The laboratory diagnosis of elm samples was carried out for Quebec and for the Maritimes. A total of 1,091 samples were received and cultured; 799 produced positive results.

Although general scouting was discontinued in Quebec in 1950, the distribution of the disease has not appeared to have changed materially during the last few years. Infected trees can usually be found wherever elm occurs except northeast of Quebec City and west of Hull. Casual observations in a few districts indicated that the intensity of the infection is increasing progressively.

The annual inspection of the six 1-square-mile sample plots established in 1946 showed 57 new infected trees in the plots and 152 in the buffer zones of 1-mile radius. Therefore, the total loss since 1946 is 13.2 per cent on the whole sample plot area which represents a variety of field conditions. In Sherbrooke, 298 new infections were found, bringing the total elm casualties reported to 1,354 for 8 years.

Hardwood Dying—For the last few years, judging from the foliage colour and growth vigour, the general health of hardwood trees has apparently been very good over most of the Province. However, during the summer of 1958 in the Gaspe Peninsula, aspen, balsam poplar, and ornamental poplars (Lombardy and Carolina) were in a state of advanced crown deterioration. Preliminary observations of this extensive dieback condition have not indicated what produced the symptoms.

In one area (on the St. Anne River near Quebec City, in Montmorency County) a new case of decline of white and yellow birch and of aspen and balsam poplar was observed during the fall of 1958. A close study of affected trees showed that the dying of most small twigs was recent and had occurred during the spring of 1956 and particularly of 1957. This new case of dieback occurred in the same area where heavy top dying of young balsam fir stands, attributed to winter drought, had occurred during the early spring of 1957 and reported that year. Similar cases were reported from other districts of Quebec.

Damping-off of Nursery Seedlings—As in 1956 and 1957, this disease was closely observed in three Quebec forest nurseries. The post-emergence killing of seedlings was as follows:

Tree species	Nursery	Time of Sowing	Percentage Killed
White spruce	Berthierville	Fall	15.3
		Spring	21.7
	Proulx	Fall	6.1
		Spring	14.9
	Drummondville	—	9.9
Red Pine	Berthierville	Fall	39.6
		Spring	14.9
	Proulx	—	56.9
	Drummondville	Fall	34.0
		Spring	30.9
White pine	Berthierville	Fall	8.3
		Spring	37.7
	Proulx	—	39.5
Jack pine	Berthierville	Fall	19.2
		Spring	4.2

Needle Yellowing of Jack Pine—The extensive needle yellowing of jack pines reported in 1956 in the Upper St. Maurice area was re-examined for the third year in 12 sample plots established in 1956. Almost all yellow needles have fallen and the new shoots on the trees are green and in good health. This confirmed the previous diagnosis that the yellowing was due to the action of the dry hot spell in the summer of 1955.

Winter Drought—The effect of the late winter and spring conditions of 1957 on balsam fir and black spruce was assessed again in 1958 in the nine sample plots established during the fall of 1957 in the Laurentide Park limits of St. Anne Pulp and Paper Co. All trees that showed red needles and dead tops have produced new shoots below the dead parts. Organisms found growing on dead stems and branches in 1958 were saprophytic fungi, mostly species of *Nectria* and *Dermea*. A critical study of affected trees in 1957 and 1958 has produced evidence that the cause of this top dying should be attributed to the conditions prevailing in the spring of 1957 as previously reported.

Armillaria Root Rot of Jack Pine—A limited dying of jack pine saplings was reported from the Upper St. Maurice region near Clova during the fall of 1957. A preliminary investigation carried out in 1958 has shown that *Armillaria mellea* (Vahl ex Fr.) Quél. is responsible for this disease which, for the last 3 years, has been confined to a very small area. Sixty out of 207 jack pine trees, 3-to 10-feet high, were killed between 1956 and 1958 and a few others are dying.

Poplar Diseases—In connection with the poplar hybrid disease resistance project in Quebec, the following poplar diseases were collected and identified during 1958.

Organism	Host	Distribution	Disease Type
Ciborinia whetzelii (Seav.) Seav.	Aspen, trembling	general	leaf blight
Cladosporium subsessile Ell. Barthold	Aspen, trembling	"	leaf spot
" "	Aspen, largetooth	occasional	" "
Didymosphaeria populina Vuill.	Poplar, balsam	general	leaf blight
Dothichiza populea Sacc & Br.	Poplar Lombardy	Quebec City	canker
" "	Poplar, Carolina	" "	"
Fusicladium radiosum (Lib.) (Lind.)	Aspen, trembling	general	leaf blight
" "	Aspen, largetooth	"	" "
" "	Poplar, hybrids	occasional	" "

Organism	Host	Distribution	Disease Type
Hypoxylon pruinatum (Klot.) Cke	Aspen, trembling	general	canker
" "	Aspen, largetooth	"	"
Linospora tetraspora Thomson	Poplar, balsam	general	leaf blight
Marssonina populi (Lib.) Sacc	Aspen, trembling	general	leaf blight
" "	Aspen, largetooth	"	" "
" "	Poplar, balsam	"	" "
" "	Cottonwood, eastern	"	" "
" "	Poplar, hybrids	"	" "
Melampsora medusae Thüm	Aspen, trembling	"	leaf rust
" "	Aspen, largetooth	"	" "
" "	Cottonwood, eastern	"	" "
" "	Poplar, hybrids	occasional	" "
Mycosphaerella populicola Thompson	Poplar, balsam	"	leaf blight
Mycosphaerella populorum Thompson	Aspen, largetooth	"	" "
Septolinia populiperda Waterm. & Cash	Poplar, hybrids	Harrington	" "
Taphrina johansonii Sadeb	Aspen, trembling	general	catkin blister
" "	Aspen, largetooth	"	" "
Taphrina populina Fr	Poplar, Lombardy	occasional	leaf blister
Uncinula salicis (DC.) Wint	Aspen, trembling	general	mildew
" "	Aspen, largetooth	"	"
" "	Poplar, balsam	"	"
Valsa nivea (Hoff.) Fr	Aspen, trembling	"	canker
Valsa sordida Nit	Aspen, trembling	"	"
" "	Aspen, largetooth	"	"
" "	Cottonwood, eastern	"	"
" "	Poplar, balsam	"	"

Other organisms were found but are not yet identified. Damage from climatic conditions is not listed.

White-pine Blister Rust—A 15-year-old white pine plantation located a St. Odilon, Dorchester County, was completely surveyed in 1958 for blister-rust. Out of 903 trees examined, 15 were dead, 52 dying, 288 seriously attacked, and 190 lightly infected. With 60 per cent of the trees already infected, this plantation is doomed as have been others attacked by this disease.

Top Breakage of Conifers in Gaspé—A severe ice storm in January 1956 caused extensive top damage to trees in the Maritime Provinces and in the Gaspé Peninsula. Aerial coverage of the spruce budworm outbreak in 1958 provided an excellent opportunity to delimit the area of top damage in the eastern half of the Gaspé Peninsula. Severe damage was general over Gaspé-Sud County except for the southern coast and north of Gaspé Bay. In these latter areas, throughout Gaspé-Sud County, and in eastern Bonaventure County, damage occurred only at scattered points.

OTHER NOTEWORTHY DISEASES

Host	Organism	Locality	Remarks
Ash	*Gloeosporium aridum* Ell. and Holw.	St. Romuald	One tree heavily blighted.
	Puccinia peridermiospora (Ell. & Tr.) Arth.	Berthierville	Heavy infection of white ash seedlings in a nursery.
Aspen	*Ciborinia whetzelii* (Seav.) Seav.	General	Heavy infection on trembling aspen in many districts.
	Fusicladium radiosum (Lib.) Lind.	General	On small trembling and large-tooth aspens in most areas.
Birch	*Melampsoridium betulinum* (Pers.) Kleb.	Sillery	A few wire birch trees heavily infected.

OTHER NOTEWORTHY DISEASES—Concluded

Host	Organism	Locality	Remarks
Birch	*Taphrina carnea* Johanson	Mont Jacques-Cartier, Gaspé.	First report on *Betula glandulosa*.
	Taphrina flava Farl.	Lac Ste. Anne, Gaspé	Light infection on mountain white birch.
Elm	*Taphrina ulmi* (Fkl.) Johanson	L'Assomption	Heavy infection on American elm seedlings in a nursery.
Fir	*Herpotrichia nigra* Hart.	Mont Jacques-Cartier, Gaspé.	First report of the brown felt blight in Gaspé Mountains.
Larch	*Melampsora bigelowii* Thüm.	Falardeau	A few trees quite heavily rusted.
Maple	*Gloeosporium apocryptum* Ell. & Ev.	Quebec City	A few Norway and sugar maple trees heavily infected.
	Taphrina dearnessii Jenkins	Quebec City	On red maple tree with blisters on most leaves.
Oak	*Taphrina coerulescens* (Desm.) Tul.	Berthierville	Heavy infection on red oak seedlings in a nursery.
Pine	*Coleosporium solidaginis* (Schw.) Thüm.	St.-Odilon, Dorchester Co.	Heavy infection on jack pine in a plantation.
Spruce	*Arceuthobium pusillum* Pk.	Mont-Albert, Gaspé	First report of this mistletoe in Gaspé on black spruce.
Willow	*Agrobacterium tumefaciens* (E.F. Sm. & Towns.) Conn.	Sillery	Large galls on roots of ornamental willow in hedge.
	Fusicladium saliciperdum (All. & Tub.) Lind.	General	Heavy infection on introduced willow trees in most areas on account of the wet and cool seasons.

PROVINCE OF ONTARIO

FOREST INSECT SURVEY

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INTRODUCTION

In 1958, the spruce budworm again devastated more of Ontario's timberland than any other forest insect. In western Ontario an eastward extension of the outbreak occurred over an area of approximately 1,900 square miles where defoliation of fir and spruce ranged from very light to severe. The infestation collapsed along part of the northern boundary where infestations have persisted for the longest time and where tree mortality has reached a high level. In western and mid-western Ontario, where defoliation of host-trees has occurred for 5 to 7 consecutive years, tree mortality intensified considerably in 1958.

Widespread infestations of the larch sawfly persisted across northern and south-central Ontario. In southern Ontario, the European pine shoot moth, European pine sawfly, and the northern pine and pales weevils were major pests of pine plantings. The last two insects severely damaged uncut Christmas trees in plantations where population levels had built-up in stumps left after selective cropping.

Insects of lesser economic importance but of unusual biological interest that attracted the attention of the Forest Insect Survey in Ontario were *Rhabdophaga swainei* Felt. (a midge on spruce), an unknown species of *Recurvaria* on jack pine, a gelechiid needle-miner on red pine in central Ontario, and a nepticulid leaf-miner on birch in the Lake Huron District.

Research projects and sub-projects of the Forest Insect Survey included studies of the larvae of *Neodiprion* sawflies, the bionomics of a pine tip moth, *Rhyacionia adana* Heinr., the description of immature stages of forest insects, and investigations of *Argyresthia laricella* Kft., *Eucosma* on pines, Coccinellidae, parasites of the European pine shoot moth, elm bark beetles, needle-miners and tube-makers on pine, and *Argyresthia aureoargentella* Brower.

The number of collections received during the season totalled 9,319, of which 73 contained no insects and the remainder provided a total of 11,740 insect samples. Forest Biology rangers submitted 8,374 collections independently, 390 jointly with personnel of the Ontario Department of Lands and Forest, 138 with other Forest Biology personnel, 24 with representatives of woods-operating companies, and 10 with miscellaneous co-operators. Insect collections were distributed among the principal host trees as follows:

Coniferous Trees	Collections		Coniferous Trees	Collections	
Pine			Spruce		
Jack Pine	1,417		White spruce	733	
Red Pine	427		Black spruce	194	
Scots pine	302		Miscellaneous spruces	56	
White pine	176				983
Miscellaneous pines	20				
		2,342	Larch		731
			Balsam fir		647

Coniferous Trees	Collections
Cedar	
Eastern white cedar	258
Northern red cedar	1
Miscellaneous cedars	5
	264
Hemlock	22
Total	4,989

Miscellaneous hosts or hosts unspecified..... 111

Broad-leaved Trees	Collections
Poplar	
Trembling aspen	1,105
Balsam poplar	171
Largetooth aspen	25
Miscellaneous poplars	36
	1,337
Birch	
White birch	621
Yellow birch	21
Miscellaneous birches	14
	656
Cherry	544
Willow	357
Alder	300
Oak	
Red oak	94
White oak	74
Miscellaneous oaks	54
	222
Elm	217
Maple	
Red maple	77
Sugar maple	39
Miscellaneous maples	35
	151
Mountain ash	78
Walnut, butternut, hickory	74
Ash	68
Basswood	52
Miscellaneous broad-leaved trees	163
Total	4,219

Grand Total..... 9,319

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—Significant changes in the area of moderate to severe defoliation by the spruce budworm occurred in western Ontario in 1958. The most notable of these was in the southwestern part of the Port Arthur District where heavy infestation extended more than 20 miles north and east of the 1957 boundary. Generally light defoliation also occurred eastward from the 1957 infestation boundary within an area of approximately 1,500 square miles including an adjacent part of the Fort Frances District. In the northeastern corner of the Fort Frances District, northward extensions of heavy infestation occurred north of Eva Lake and in the Crooked Pine Lake area. Along the northern periphery of the outbreak in the Kenora and Sioux Lookout districts, the infestation subsided in a broad U-shaped area where host-tree mortality was severe. It extended from Lac Seul south to Rowell and Britton townships and west to the English River. North of the main body of the outbreak most of the numerous small areas of heavy infestation reported in the Sioux Lookout District in 1957, subsided in 1958. However, small pockets of defoliation were observed at Moar and Eagle Lakes. The location and extent of infestations in Ontario are shown on the accompanying map.

Recent developments in the Port Arthur District and in the northeastern part of the Fort Frances District are of particular interest because it has been on this front that the greatest change in infestation boundaries has occurred each year since 1955. In the Port Arthur District heavy infestation extended over an area of approximately 400 square miles compared with 100 square miles in 1957. The eastern boundary of heavy infestation extended from Gunflint Lake on the International Border, along the west shore of Northern Light Lake to the southern part of Aweres Township, thence southwest to Zephira Lake on the Port Arthur–Fort Frances District boundary. Within the adjacent area classified as light defoliation, ground-checks revealed low population levels at numerous points

north to Colliver Township and east to Block No. 2. Results of an egg-mass survey carried out in Division 34, Port Arthur District, indicate that infestations in the area lightly defoliated in 1958 will intensify in 1959. The insect was found commonly in adjoining Division 24, in 1958 and light infestations are forecast for the southern part of the Division.

The heavy infestation on Sibley Peninsula in the Port Arthur District showed little change from 1957. Pockets of heavy infestation were noted on Black Bay Peninsula, along the east bank of Nipigon River, and at Shillabeer Creek in Hele Township.

As in 1957, the area of heavy infestation in the Geraldton District extended roughly from Pays Plat east to Township 84 and north to Roslyn Lake. To the south, on Copper, Wilson, Simpson, and the eastern part of St. Ignace islands, defoliation was also severe.

Heavy infestation persisted in a white spruce plantation in the Uxbridge Forest for the sixth consecutive year and a new infestation caused moderate defoliation of a 5-acre stand of white spruce in the Midhurst Forest, both in the Lake Simcoe District. The light infestation reported in a small bushlot in Admaston Township, Tweed District, in 1957, was restricted to several trees in 1958.

A further extension of the area of severe host-tree mortality occurred in the general area of Sioux Lookout and pockets of light and moderate mortality were observed on the west side of Sturgeon Lake. In the western part of the Kenora District, heavy mortality that began in numerous pockets north of Lake of the Woods in 1957, expanded considerably in 1958 and intensified in an area between Oneman Lake in the north and Godson Township in the south. Severe mortality has occurred on Sibley and Black Bay peninsulas in the Port Arthur District. In the Geraldton District sample plots showed moderate mortality in the Cavers Lake and Wabasta Lake areas and tree mortality was severe at Roslyn Lake.

Chapleau	4	Lake Simcoe	5
Cochrane	1	Port Arthur	87
Fort Frances	58	Sault Ste. Marie	15
Geraldton	34	Sioux Lookout	54
Kapuskasing	5	Sudbury	8
Kemptville	2	Tweed	3
Kenora	18	White River	15
Lake Huron	1		

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—The heavy infestation of larch stands in northwestern Ontario during the late forties and early fifties was followed by a general decline to light infestation in the Sioux Lookout, Kenora, Port Arthur, and Geraldton districts beginning in 1954. This coincided with a gradual eastward and southward spread of the outbreak into northeastern and central Ontario. In 1958 medium and heavy infestations were concentrated in the Sault Ste. Marie, Chapleau, Gogama, Swastika, and Cochrane districts. Pockets of moderate or severe defoliation were more numerous than in 1957 across the remainder of northern Ontario. No important changes were detected in southern Ontario where infestations generally were light and where single or small groups of trees were severely defoliated in 1957.

The impact that persistent infestations will have on larch stands in the immediate future is uncertain. Previously in northwestern Ontario trees sustained defoliation for as long as 11 years (1943-1953) with negligible mortality. In some areas where disturbances have influenced watertable levels heavy mortality of weakened trees has resulted.

Chapleau	27	Lindsay	34
Cochrane	41	North Bay	15
Fort Frances	38	Parry Sound	22
Geraldton	29	Pembroke	19
Gogama	50	Port Arthur	31
Kapuskasing	24	Sault Ste. Marie	24
Kemptville	19	Sioux Lookout	14
Kenora	16	Sudbury	13
Lake Erie	7	Swastika	33
Lake Huron	17	Tweed	37
Lake Simcoe	21	White River	29

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)—Three significant extensions in the distribution of this introduced sawfly were apparent in the Southwestern Region. These were located east and south of Owen Sound, Lake Huron District; in Dufferin, Peel and Simcoe counties, Lake Simcoe District; and in the eastern part of the Lake Erie District, where light infestations were found from 6 to 10 miles beyond the insect's known range in 1957. The accompanying map shows these extensions and the northern and eastern limits of its range based on surveys conducted in 1958.

The following statement prepared by Dr. F. T. Bird, Insect Pathology Laboratory, Sault Ste. Marie, Ontario concerns the status of virus disease of this sawfly:

"The virus disease of the European pine sawfly introduced in southwestern Ontario from 1950 to 1953 has kept larval populations at a very low level and defoliation negligible in Scots pine plantations 10 years or more old. Some plantations in which virus was introduced were subsequently sprayed with insecticides and finally abandoned after most of the trees suitable for Christmas trees were removed. The virus has persisted in these plantations and infestations of *N. sertifer* in many acres of cull trees are being controlled by disease.

The virus has not been as effective in plantations of small trees (the chief interest of the Christmas tree grower) except in those plantations sprayed with virus each year or as frequently as necessary to prevent defoliation.

In general a line from Goderich to Woodstock to Hamilton demarcates an area to the south where virus has been widely distributed, where disease is prevalent, and where *N. sertifer* numbers are few, and an area to the north where the distribution of the virus has not been extensive and where *N. sertifer* populations are healthy and defoliation severe."

Survey data generally confirm these differences in infestation intensities in old plantations in the Lake Huron and Lake Erie districts. However, defoliation of numerous young plantations in parts of the Lake Huron District south of the line referred to above was severe again in 1958.

Lake Erie	28	Lake Simcoe	20
Lake Huron	54		

Pine Root Collar Weavil, *Hylobius radicis* Buch.—This destructive weevil continued to ravage Scots and red pine plantations in the Lake Simcoe District where infestations have been restricted to parts of Essa, Tosorontio, Sunnidale, Vespra, and Tiny townships. Several young plantations with trees that had grown to a susceptible size became infested in 1958. Tree mortality, though extensive, could not be measured because of the removal of weakened and dead trees.

No new infestations were detected in the Pembroke District.

The numbers of trees infested and dead or dying in the four infested Scots pine plantations previously surveyed were as follows:

Location	No. of Trees Examined	Av. Height in ft.	No. of Trees Infested (Past and Present)		No. of Trees Dead or Dying	
			1957	1958	1957	1958
Hagarty Tp. Lot 13 Con. XIII	30	10	30	30	30	30
Petawawa Tp. Lot 25 Con. VII	40	8	6	5	1	1
Petawawa Tp. Lot 27 Con. III	943	8	374	401	137	198
Westmeath Tp. Lot 13 West Front A	300	40	60	69	25	28

One new infestation was detected on Highway 118 in Monck Township, Parry Sound District, where 21 trees in a Scots pine hedge were attacked and one tree 4 inches D.B.H. was dead.

Pales Weevil, *Hylobius pales* (Hbst.)—Severe damage to healthy pine trees was caused by this weevil in numerous plantations in southern Ontario where Christmas trees had been cropped and where stumps had been left for several consecutive years providing suitable breeding material. The adult weevil feeds on the bark of twigs and small branches during the late fall and early spring, usually in association with the northern pine weevil, *Pissodes approximatus*, and causes branch killing and makes severely damaged pines valueless as Christmas trees.

Heavy losses from this weevil and the northern pine weevil were recorded in Cartwright, Manvers, and Clarke townships in Durham County, in Tiny and Oro townships in Simcoe County, in Mulmer and Mono townships in Dufferin County, and Whitchurch Township in York County. One of the heaviest losses recorded was in Clarke Township where 86 per cent of the trees left growing among infested stumps showed branch killing. Losses were less severe in other areas, but large acreages will be subject to similar damage in 1959. Stumps in two plantations in Marlborough Township, Kemptville District, were heavily infested with larvae of both species of weevil at mid-summer.

Although chemical control measures can be used, treatment is complex. The larvae tunnel in the roots usually away from the stump and the emerging adults move vertically through the soil to the surface. The uprooting and burning of stumps soon after cutting is the only satisfactory means of control.

Fort Frances	1	Lindsay	2
Kemptville	1	Parry Sound	1
Lake Simcoe	2	Sault Ste. Marie	1

Northern Pine Weevil, *Pissodes approximatus* Hopk.—This weevil is slightly smaller than the pales weevil, but it breeds in the same type of material and causes similar damage to healthy pines. Its life history is also similar except that the larvae feed in stumps exclusive of the roots and pupate in the wood above ground level. The locations of weevil infestations described in the preceding account apply equally to the northern pine weevil. Damage caused largely by this species also occurred near Paris in the Lake Huron District and in the Courtland–Simcoe area of the Lake Erie District.

Fort Frances	2	Lindsay	6
Kemptville	1	Port Arthur	1
Lake Huron	1	Sault Ste. Marie	1
Lake Simcoe	3	White River	1

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)—The status of this introduced pest of Scots and red pine in southern Ontario showed little change from 1957. The numbers of infested shoot clusters remained low in York and Ontario counties, Lake Simcoe District, in the Dunnville area on the Niagara Peninsula, and in Halton and Wentworth counties, Lake Huron District, where marked declines in infestation intensity were reported in 1957. Pine plantations in these areas have shown remarkable growth recovery since the cessation of heavy attack.

Plantings suffered moderate to severe damage in a large part of the Lake Huron District, in the central part of the Lake Simcoe District, and in Houghton, Aldborough, and Euphemia townships in the Lake Erie District. Red pine hedgerows in Darlington and Clarke townships, Lindsay District, supported high population levels. Light damage was reported at many locations in the above districts.

A single larva collected from a jack pine tree near Blind River in the Sault Ste. Marie District is the most northerly record of this insect on native pine in Ontario. It has occasionally been collected from Mugho pines in this district.

Lake Erie	23	Lindsay	10
Lake Huron	11	Sault Ste. Marie	2
Lake Simcoe	13		

A European Bud Moth, *Exoteleia dodecella* Linn.—The establishment of extensive Scots pine plantings in southern Ontario has created suitable conditions for the propagation and spread of this bud moth. Old damage to pine trees resembles that caused by the European pine shoot moth. High population levels were reported in 1958 in a plantation in Clarke Township, Lindsay District; on roadside plantings north of Manchester, Lake Simcoe District; north of Deseronto, Tweed District; and in Ketley and Edwardsburg townships, Kemptville District. Light to medium infestations occurred on Scots and Mugho pines at numerous points throughout southern Ontario as far north as Ottawa and Owen Sound.

Kemptville	5	Lake Simcoe	27
Lake Erie	7	Lindsay	3
Lake Huron	8	Tweed	4

A Pine Tip Moth, *Rhyacionia adana* Heinr.—A new pest of young pines that causes damage resembling that of the European pine shoot moth has been recognized in Ontario. Trees 9 to 12 inches high and the lower half of trees up to 24 inches in height, are most severely damaged. Trees over this height are seldom attacked. This infestation pattern was noted at Burks Falls in the Parry Sound District where the insect was first discovered and where it has persisted for at least 3 years. In the Lake Simcoe District young red and Scots pine plantations were commonly infested, with the numbers of insects being highest in 2-year-old plantings. One red pine plantation near Stayner in Dufferin County was severely damaged. Natural jack pine regeneration in the Sudbury and Parry Sound districts was often heavily infested. The insect also occurred in small numbers in the Sault Ste. Marie, North Bay and Lake Huron districts.

American Aspen Beetle, *Phytodecta americana* (Schaeff.)—This defoliator has maintained a moderate level of abundance in young aspen stands throughout the northern two-thirds of Ontario during the past 2 years. Small pockets of moderate and heavy defoliation occurred commonly in several districts and infestations abated in others.

Chapleau	22	Parry Sound	5
Cochrane	38	Pembroke	1
Fort Frances	2	Port Arthur	4
Geraldton	4	Sault Ste. Marie	5
Gogama	18	Sioux Lookout	2
Kapuskasing	19	Sudbury	12
Kenora	5	Swastika	12
Lake Simcoe	3	Tweed	2
Lindsay	3	White River	13
North Bay	10		

White-pine Weevil, *Pissodes strobi* (Peck)—The prospects of growing white pine plantations free from severe weevilling have improved considerably in recent years with the development of practical chemical control methods. This insect, however, remains an acute problem on white and jack pine regeneration in remote areas where chemical control is unpractical.

The white-pine weevil was also a common pest of Scots and red pines and Norway spruce again in 1958. It was also common on black and white spruce in northern Ontario, even beyond the northern range of its favoured host tree, white pine.

Chapleau	11	Lindsay	23
Cochrane	19	North Bay	9
Fort Frances	2	Parry Sound	6
Geraldton	4	Pembroke	11
Gogama	3	Port Arthur	8
Kapuskasing	4	Sault Ste. Marie	17
Kemptville	2	Sioux Lookout	2
Kenora	5	Sudbury	11
Lake Huron	3	Swastika	6
Lake Simcoe	8	Tweed	6
		White River	4

European Elm Leaf Beetle, *Galerucella xanthomelaena* (Schr.)—There was little change in the status of this introduced leaf beetle in southern Ontario in 1958. Damage to elms increased in the Niagara Peninsula where infestations were generally light, but small areas of medium infestation occurred and severe skeletonizing was noted in Clinton, Louth, and Wainfleet townships. The St. Thomas, Tecumseh, and Amherstburg infestations remained light, but a new heavy infestation was found in a woodlot a few miles southeast of St. Thomas. Sampling in the town of Essex gave negative results. In the Lindsay District the insect caused severe defoliation of all elms on the Ontario Hospital grounds in Cobourg.

Lake Erie	9	Lindsay	1

An Elm Casebearer, *Coleophora ulmifoliella* McD.—Elm trees near Cobourg, including those damaged by the European elm leaf beetle, were heavily infested with casebearers. Severe browning of elm foliage was also noted in Hallowell Township, Tweed District.

Lake Erie	5	Tweed	1
Lake Huron	2	Lindsay	1

Larch Casebearer, *Coleophora laricella* (Hbn.)—Population levels of this insect have been comparatively low in Ontario for the past several years, due in part to the effectiveness of an introduced parasite, *Agathis pumila* (Ratz.), that has become established in central and southern Ontario. Light to medium infestations occurred at widely-separated locations in the Port Arthur, Sudbury, Parry Sound, Lake Huron, and Lake Erie districts in 1958. The average number of larvae found at selected sample points are shown in the following table.

District	Township	Av. no. of larvae per 18"-branch tip.
Port Arthur	MacGregor	8
Sault Ste. Marie	Wells	2
Sudbury	Dill	8
Parry Sound	Perry	15
Lake Huron	Amabel	8
Lake Erie	Bosanquet	12
Lindsay	Minden	4
Kemptville	Elizabeth	1

Kemptville	4	Pembroke	10
Lake Erie	7	Port Arthur	14
Lake Huron	4	Sault Ste. Marie	4
Lake Simcoe	8	Sudbury	5
Lindsay	9	Tweed	2
North Bay	7	White River	1
Parry Sound	13		

Red-headed Pine Sawfly, *Neodiprion lecontei* (Fitch)—High population levels of this perennial pest of red pine prevailed in the southern half of Ontario in 1958. In many instances effective chemical control operations were carried out, thus preventing serious defoliation. Infestation intensities increased considerably in roadside plantings along Highway 17 in the Sault Ste. Marie and Sudbury districts compared with 1957. Pockets of heavy infestation also occurred along the Chapleau Highway between Aubrey Falls and the district border in the former district, and in plantations in Tennyson and Hallam townships, in Robinson Township on Manitoulin Island, and in red and Scots pine plantations on Cockburn Island, Sudbury District.

In contrast with this general upward trend, infestation intensities declined somewhat in the North Bay and Parry Sound districts. However, several red pine plantations in the southeastern part of the North Bay District and the northwestern part of the Parry Sound District suffered severe defoliation.

Noteworthy infestations in southern Ontario occurred as follows: in the northern part of Ontario County and in Simcoe County, Lake Simcoe District; in parts of the Victoria County Forest and in plantations in Hope, Manvers, Cavan and Clarke townships, Lindsay District; in Ameliasburgh, and Mayo townships, Tweed District; and in Lanark, Dalhousie, Gloucester townships, at the Kemptville Nursery and in the Larose Forest, Kemptville District.

Kemptville	20	Parry Sound	23
Lake Huron	4	Pembroke	31
Lake Simcoe	19	Sault Ste. Marie	14
Lindsay	34	Sudbury	16
North Bay	8	Tweed	27

Swaine Jack-pine Sawfly, *Neodiprion swainei* Midd.—There was little change in the extent and intensity of infestations of this sawfly in central Ontario. Severe defoliation of jack pine trees was restricted to islands in Banks and Makobe lakes, Swastika District; in Rabbit Lake, North Bay District; and in Minesinakwa Lake, Gogama District. Colonies were found more commonly than in 1957 in the general area where the Chapleau, Sault Ste. Marie, and Sudbury districts join; occasional small groups of jack pine trees were heavily attacked.

Chapleau	14	Sault Ste. Marie	11
Gogama	33	Sudbury	20
North Bay	17	Swastika	7
Parry Sound	6		

Red-headed Jack-pine Sawfly, *Neodiprion virginianus* complex—Marked increases in the number of larval collections and reports of infestations were received from districts throughout this insect's range of distribution in Ontario. Numerous medium to heavy infestations, were recorded on jack pine as follows: In Richardson, Aylsworth, and Claxton townships, Fort Frances District; in Newmarket and Purvis townships, Cochrane District; on numerous small islands and along lakeshores, Chapleau and Gogama districts; in Hallam and Carnarvon townships, Sudbury District; at many points in the North Bay District; in a large area along the Still River in Henry Township and in six other townships in the northwestern part of the Parry Sound District; and in three small plantations in the Lake Simcoe District.

Chapleau	47	Parry Sound	12
Cochrane	8	Port Arthur	18
Fort Frances	9	Sault Ste. Marie	19
Geraldton	4	Sioux Lookout	4
Gogama	50	Sudbury	33
Kapuskasing	3	Swastika	11
Kenora	13	Tweed	4
Lake Simcoe	8	White River	27
North Bay	20		

Red-pine Sawfly, *Neodiprion nanulus nanulus* Schedl—Population levels of this sawfly were low throughout most of Ontario. Light infestations were reported in small stands of jack pine in Common and Pearkes townships, White River District and in Inwood Township, Port Arthur District. Several light infestations were observed on clumps of jack and red pine trees in the Kenora District, and at Loggers and Maynard lakes and north of Dryden in the Sioux Lookout District.

Chapleau	18	Pembroke	2
Fort Frances	2	Port Arthur	10
Kenora	23	Sioux Lookout	12
Lake Huron	1	Sudbury	4
Lake Simcoe	5	Tweed	1
North Bay	6	White River	14
Parry Sound	4		

Black-headed Jack-pine Sawfly, *Neodiprion pratti banksianae* Roh.—Colonies of this sawfly were numerous on jack pine trees in four widely separated localities. Heavy infestations persisted on two islands in West Bay of Lake Nipissing where considerable tree mortality has resulted from repeated attacks. Severe defoliation was observed on a small island in Rainy Lake, Fort Frances District; on several plantings in Humphrey Township, Parry Sound District; and in a small plantation near Elmwood, Lake Huron District.

In 1957 Mr. D. R. Wallace showed that collections of *Neodiprion maurus* Roh. had previously been misidentified as *N. pratti banksianae.* Although these two sawflies were properly determined in 1958, past infestations described under black-headed jack-pine sawfly, particularly those in the Boreal Forest and the northernmost part of the Great Lakes–St. Lawrence Forest Region, may have been *N. maurus.*

Chapleau	5	North Bay	8
Fort Frances	16	Parry Sound	17
Kemptville	9	Pembroke	9
Kenora	18	Sioux Lookout	13
Lake Huron	15	Sudbury	15
Lake Simcoe	5	Tweed	10
Lindsay	2	White River	2

Balsam-fir Sawfly, *Neodiprion abietis* complex—The general decline in abundance of this insect in Ontario over the past 3 years continued in 1958 in areas previously infested. Increased numbers, however, occurred in other areas.

In the Southeastern Region open-grown balsam fir trees were heavily infested in Bagot and Bangor townships in the Tweed District; medium and light infestations were noted at other locations. In the Lake Huron District infestations declined to light intensity in Brant Township.

In central Ontario population levels increased in the southern part of the Pembroke District, in the Parry Sound District, and in the southern part of the Sudbury District, including Manitoulin Island.

Wide variation in the seasonal development reflects the complexity of the forms involved. In the Parry Sound District, larval colonies and defoliation were not conspicuous until late July, much later than in previous years. In the Lindsay district both early and late larval populations were observed.

Chapleau	4	Parry Sound	16
Fort Frances	4	Pembroke	7
Geraldton	1	Port Arthur	3
Kemptville	7	Sioux Lookout	2
Kenora	1	Sudbury	3
Lake Huron	9	Tweed	6
Lake Simcoe	1	White River	1
Lindsay	10		

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)—The northward spread of mountain-ash sawfly infestations in central Ontario continued in 1958. Whereas population levels remained much the same as in 1957 south of Lake Nipissing, they increased in the North Bay, Sudbury, and Sault Ste. Marie districts. In 1958 sawflies were collected from mountain ash trees as far north as Haviland Bay along Lake Superior and in three townships in the Swastika District where collections had not previously been made.

Kemptville	2	Parry Sound	10
Lake Erie	3	Pembroke	7
Lake Huron	5	Sault Ste. Marie	8
Lake Simcoe	2	Sudbury	11
Lindsay	2	Swastika	3
North Bay	4	Tweed	2

An Alder Sawfly, *Arge* sp.—Infestations of this sawfly on speckled alder along lakeshores in recent years have been characterized by severe localized defoliation for one season. In 1958 two areas of medium infestation occurred in the Gogama District, on the east shore of Ivanhoe Lake, and along the shoreline of Schewabik Lake. Light defoliation was observed at 18 points in the Chapleau District, in Wallbridge and Chapman townships in the Parry Sound District and at Shabuskwi Lake in the Sioux Lookout District.

Chapleau	20	Pembroke	1
Cochrane	3	Sault Ste. Marie	3
Gogama	13	Swastika	1
Parry Sound	3	White River	7

A Leaf-folding Sawfly, *Nematus* sp.—The abundance of this leaf-folder on trembling aspen, balsam poplar, and willow in most districts of Ontario was similar to that in 1957. Sampling results showed a wide range of frequency with a maximum count of 174 folds per 100 leaves in Harburn Township, Lindsay District. In the Sault Ste. Marie District and parts of the Western Region, however, a large proportion of the folds were found to be empty.

Chapleau	12	Lindsay	10
Cochrane	48	North Bay	19
Fort Frances	6	Parry Sound	13
Geraldton	15	Pembroke	28
Gogama	20	Port Arthur	5
Kapuskasing	44	Sault Ste. Marie	19
Kemptville	6	Sioux Lookout	17

Kenora	5	Sudbury	14
Lake Erie	3	Swastika	12
Lake Huron	14	Tweed	9
Lake Simcoe	5	White River	45

A Leaf Miner on Birch, *Profenusa alumna* (MacG.)—Infestations have persisted for several years in parts of the Northern and Central forest regions. Severe browning of foliage was noted in four townships in the Timmins area and along the south shore of Frederickhouse Lake, Cochrane District; around Rufus Lake, Kapuskasing District; and along the east shore of Elk Lake, Swastika District. In the Central Region, patches of heavy infestations were reported in a narrow strip along the east shore of Lake Superior between Pancake Bay and Sand River, at the south end of Anjigami Lake, and in the Old Woman River watershed, Sault Ste. Marie District; and in Pearkes Township and Township 30, Range XXIII, White River District. In the Chapleau, Gogama, and Sudbury districts damage was of a moderate intensity at a few locations and light infestation was widespread.

Chapleau	31	Parry Sound	2
Cochrane	12	Pembroke	6
Gogama	16	Sault Ste. Marie	25
Kapuskasing	1	Sudbury	8
Kemptville	1	Swastika	7
Lake Huron	2	Tweed	1
Lindsay	1	White River	4
North Bay	5		

Birch Leaf-mining Sawfly, *Heterarthrus nemoratus* (Fall.)—The foliage of white birch trees on Grennough Point and along the Sauble River in Amabel Township, Bruce Peninsula, and in small areas along the east shore of Lake Superior was heavily mined by this insect.

Chapleau	2	Pembroke	3
Lake Huron	15	Sault Ste. Marie	10
North Bay	1	Sudbury	1
Parry Sound	3	White River	1

Birch Leaf Miner, *Fenusa pusilla* (Lep.)—As in 1957, heavy infestations were most numerous in southeastern Ontario. The foliage of birch trees was severely mined throughout most of the Lindsay District, in Leeds and Glengarry counties in the Kemptville District, and at one location in Monteagle Township, Tweed District. Balled birch stock at the Midhurst Nursery and trees in a plantation in Colborne Township, Lake Huron District, were heavily infested. In the Lake Erie District medium infestations were found around Delhi and in the St. Williams Nursery. Infestations in the southeastern part of the North Bay District increased to heavy intensity following a decline reported in 1957.

Kemptville	11	North Bay	6
Lake Erie	5	Parry Sound	9
Lake Huron	4	Pembroke	7
Lake Simcoe	2	Sudbury	11
Lindsay	12	Tweed	2

Balsam Bud-mining Sawfly, *Pleroneura borealis* Felt—This sawfly, whose damage to the developing shoots of balsam fir resembles frost damage, appeared in large numbers over an extensive area in central and south-central Ontario. Population levels paralleled those reported in 1956 when the insect was last prevalent over a broad area. For example, at seven sample points in the Parry Sound District roughly 8 per cent of the shoots of balsam fir were infested in 1956 compared with 10 per cent in 1958. Counts were negative at all locations sampled in 1957 except one where approximately 2 per cent of the new shoots were infested.

In 1958 heavy infestations were noted at several points in Havelock Township, Lindsay District, and less severe damage was noted in the Fort Frances, Chapleau, Sudbury, North Bay, Parry Sound, Pembroke, and Tweed districts.

Chapleau	16	Parry Sound	21
Cochrane	2	Pembroke	24
Fort Frances	4	Port Arthur	4
Gogama	3	Sault Ste. Marie	16
Kemptville	1	Sudbury	27
Lindsay	10	Tweed	2
North Bay	20	White River	3

Green-striped Mapleworm, *Anisota rubicunda* (Fabr.)—Since the late forties when an outbreak of this insect occurred in hard-maple stands on Manitoulin Island and east of Sault Ste. Marie, no major infestations have been observed in Ontario. During this period pockets of medium to heavy infestation have occurred sporadically on understory red maple at widely-separated locations. Infestations that occurred in 1957 at Calm Lake and Lac La Croix in the Fort Frances District and in the Sudbury area declined to very light intensity in 1958.

Fort Frances	13	Parry Sound	3
Lake Erie	8	Sault Ste. Marie	3
Lake Huron	1	Sudbury	16
Lindsay	1	Swastika	5
North Bay	3	Tweed	1

Orange-striped Oakworm, *Anisota senatoria* J. E. Smith—Pockets of infestation occurred in much the same general areas of southern Ontario as in 1957. Medium to heavy infestations were observed on white and bur oaks between Frankfort and Glen Miller and in Sophiasburgh Township, Tweed District, and south of Campbellford, Lindsay District. The medium to heavy infestations in Bosanquet and Yarmouth townships, Lake Erie District, reported in 1957, declined to light intensity in 1958. Elsewhere in the district, scattered oak trees were lightly defoliated for the second consecutive year in the Townsend Township area and a light infestation occurred in the southeastern part of the Niagara Peninsula. In the Lake Huron District, scattered bur oak trees near Ingersoll were severely defoliated.

Lake Erie	7	Lindsay	1
Lake Huron	6	Tweed	6

Walnut Caterpillar, *Datana integerrima* G. and R.—This insect occurs throughout southern Ontario as far north as the southern tip of Georgian Bay and Ottawa. Infestations declined in the Lake Huron District and in the southwestern part of the Lake Erie District in 1958. Populations in the Lake Simcoe District subsided to the lowest level witnessed in several years, only occasional colonies being observed. In contrast, defoliation increased considerably in the northwestern and eastern parts of the Lake Erie District, particularly in Lambton and Lincoln counties, where medium to heavy infestations occurred. In the Lake Huron District, the insect was most prevalent in the southern counties where moderate defoliation of walnut trees was observed at numerous locations.

Light defoliation of butternut and shagbark hickory was observed commonly in Prince Edward County; in Sidney Township, Tweed District; and scattered larval colonies were noted on walnut trees in the southern part of Lindsay District.

Lake Erie	9	Lindsay	1
Lake Huron	13	Tweed	8
Lake Simcoe	1		

Yellow-necked Caterpillar, *Datana ministra* (Drury)—There was a marked reduction in the general population level of this insect in southwestern Ontario as compared with recent years. Heavy infestations that occurred along Highway 401 east of Toronto and along the Queen Elizabeth Highway in 1957 declined to light intensity in 1958. Infestations elsewhere in the region were for the most part light. Small numbers of colonies were observed on white elm, basswood and wild apple trees along Highway 7 in the Lindsay District, and in Prince Edward County, Tweed District.

Cochrane	1	Lake Huron	3
Fort Frances	1	Lake Simcoe	2
Gogama	1	Lindsay	2
Kemptville	2	Sault Ste. Marie	3
Kenora	3	Sudbury	1
Lake Erie	10	Tweed	6

Spring Cankerworm, *Paleacrita vernata* (Peck)—As in 1957 this cankerworm was found commonly on white elm trees in several areas of southern Ontario. The infestation near Craighurst in the Lake Simcoe District, reported each year since 1950, again caused severe defoliation of elm. Individual or small groups of trees were also heavily defoliated at widely separated points in York, Simcoe, and Ontario counties, and a new infestation was noted in a 5-acre area south of Highway 7 in Toronto Township. In the Tweed District, roadside plantings along Highway 17 in Horton Township were severely attacked. Population levels declined considerably in the Lake Huron District. Fall cankerworms and basswood loopers were frequently associated with the spring cankerworm.

Lake Simcoe	5	Tweed	1
Lindsay	1		

Fall Cankerworm, *Alsophila pometaria* (Harr.)—Infestations of this insect continued in the Fort Frances District and in southwestern Ontario, but declined from heavy intensity in 1957 to light in 1958 in the Town of Fort Frances and in Wentworth and Halton counties, Lake Huron District. Small stands of its favoured host tree, white elm, were severely defoliated in Vespra and Toronto townships, Lake Simcoe District. Moderate defoliation was noted at several points in the Niagara peninsula.

Fort Frances	7	Lake Huron	2
Kemptville	2	Lake Simcoe	2
Lake Erie	16	Pembroke	1

Birch Skeletonizer, *Bucculatrix canadensisella* Chamb.—The heavy infestations reported in 1957 in North Walsingham, Charlotteville, and Middleton townships in the Lake Erie District expanded northeastward into Windham Township. In the Lake Huron District, the medium infestation in South Norwich Township increased to heavy intensity and several light infestations were observed.

Lake Erie	2	Sault Ste. Marie	1
Lake Huron	5		

Fall Webworm, *Hyphantria cunea* (Drury)—Minor changes were reported in the general abundance of this defoliator, but locally population trends differed considerably from previous years. In the Lake of the Woods area in western Ontario, where the heaviest defoliation was reported in 1957, infestations subsided to light intensity. Infestations on several islands in Rainy Lake persisted at a high level. In the remainder of Ontario severe defoliation occurred as follows: on alder and serviceberry near Gogama, on willow near Westmeath in

the Pembroke District, on black ash in four townships along Highway 7, and on mixed hardwood species in Sophiasburgh and Sheffield townships, Tweed District.

Chapleau	13	Lindsay	25
Cochrane	1	North Bay	11
Fort Frances	21	Parry Sound	14
Geraldton	15	Pembroke	31
Kemptville	20	Port Arthur	5
Kenora	19	Sault Ste. Marie	23
Lake Erie	18	Sioux Lookout	1
Lake Huron	31	Sudbury	24
Lake Simcoe	19	Tweed	22
		White River	2

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.—Outbreaks of this insect occur at roughly 10-year intervals and because the last outbreak began in 1948, the Forest Insect Survey has been on the alert for signs of a new outbreak. Colonies were observed in two widely separated areas. The first was in the Kenora District where very light defoliation of trembling aspen was apparent and where caterpillars and cocoons were collected near Whitney, Cobble and Triangle lakes, and in Mutrie, Sanford, and Melick townships. The second was in the Lake Erie District where larvae were collected most commonly from basswood in several woodlots in Lambton, Middlesex, and Elgin counties.

The heavy infestation that appeared in the Lake St. Joseph area of Sioux Lookout District in 1956 and 1957 was restricted in 1958 to one island in the west end of the lake.

Fort Frances	2	Lake Simcoe	1
Kenora	11	Sioux Lookout	19
Lake Erie	12		

Eastern Tent Caterpillar, *Malacosoma americanum* (F.)—Small pockets of infestation were noted at many points from the North Bay District southward. Local increases in population level occurred in Parry Sound, Pembroke, Lake Simcoe, Lake Huron, and Lake Erie districts, with scattered pockets of heavy infestation in the last named district.

Kemptville	2	North Bay	4
Lake Erie	10	Parry Sound	17
Lake Huron	6	Pembroke	5
Lake Simcoe	10	Sudbury	5
Lindsay	20	Tweed	11

Western Tent Caterpillar, *Malacosoma pluviale* (Dyar)—No marked changes in the general abundance of this insect have occurred in the past several years. In 1958 larval tents were most numerous along roadsides in Noble Township, Gogama District, and in the northern part of the Blind River Division, Sault Ste. Marie District. Small numbers were observed at widely separated points elsewhere in northern Ontario.

Chapleau	10	Port Arthur	10
Cochrane	8	Sault Ste. Marie	16
Geraldton	9	Sioux Lookout	3
Gogama	20	Sudbury	3
Kapuskasing	1	Swastika	1
Kenora	2	White River	12

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)—Most of the large infestations that developed in central and western Ontario in 1956 and 1957 declined considerably in 1958. The only noteworthy exception was in the Pigeon River area, southwest of Port Arthur, where infestations increased in extent compared with 1957 with the result that trembling aspen stands bounded by the Cascades, Pine River, and Pine Bay were severely defoliated.

Numerous large areas of heavy infestation in the Central Region declined considerably in extent compared with 1957. However, severe defoliation of poplar stands did recur in sizeable areas in the eastern half of the Sault Ste. Marie District, in the central and northwestern part of the Chapleau District, and in the southern half of the Sudbury District including Manitoulin and Cockburn islands. The heavy infestation in the southeastern part of the White River District subsided in 1958. In northeastern Ontario, the heavy infestation in the vicinity of Iroquois Falls subsided, although severe defoliation of poplar recurred in four small areas in the southwestern part of the Cochrane District. The large infestation southwest of Savant Lake in western Ontario declined to very light intensity in 1958.

Chapleau	28	North Bay	1
Cochrane	13	Parry Sound	7
Fort Frances	5	Port Arthur	15
Geraldton	13	Sault Ste. Marie	34
Gogama	33	Sioux Lookout	5
Kapuskasing	3	Sudbury	48
Kenora	4	Swastika	12
Lake Erie	1	White River	26
Lake Simcoe	3		

A Leaf Roller, *Epinotia solandriana* Linn.—During the past 2 years unusually large numbers of this leaf roller have infested trembling aspen trees in parts of the Boreal Forest region. There was a noticeable increase in the Cochrane and Kapuskasing districts in 1958. In the former district, heavy infestations occurred in Teefy and Edwards townships north of Iroquois Falls, and medium infestations were observed in five townships around Cochrane. Moderate damage was noted in Shackleton and Nassau townships in the Kapuskasing District.

Chapleau	1	Parry Sound	2
Cochrane	24	Pembroke	1
Fort Frances	1	Port Arthur	1
Geraldton	2	Sault Ste. Marie	5
Gogama	2	Sioux Lookout	2
Kapuskasing	21	Sudbury	7
Kenora	7	Swastika	15
Lake Simcoe	3	Tweed	3
Lindsay	1	White River	3
North Bay	5		

Cherry Ugly-nest Caterpillar, *Archips cerasivoranus* (Fitch)—Infestations of this insect were generally comparable to those reported in 1957. Roadside cherry and other deciduous shrubs were covered with unsightly webbing at numerous locations in central Ontario and at widely scattered points elswehere.

Chapleau	2	Lindsay	14
Cochrane	5	North Bay	13
Fort Frances	8	Parry Sound	14
Geraldton	6	Pembroke	9
Gogama	8	Port Arthur	12
Kapuskasing	11	Sault Ste. Marie	16
Kemptville	3	Sudbury	9
Kenora	5	Swastika	8
Lake Erie	2	Tweed	5
Lake Huron	6	White River	4
Lake Simcoe	1		

Spruce Bud Moth, *Zeiraphera ratzeburgiana* Ratz.—Infestations reported in the Port Arthur, Gogama, and Lake Huron districts in 1957 declined sharply in 1958. The developing buds of mature spruce trees along the Mississagi River in Thompson Township, Sault Ste. Marie District, were severely damaged.

Fort Frances	1	Port Arthur	12
Geraldton	1	Sault Ste. Marie	6
Kenora	1	Sudbury	1
Lindsay	1	White River	1

A Tortricid on Oak, *Argyrotoza semipurpurana* Kft.—This small larva that attacks the new leaves of oak in early spring, caused severe defoliation in a 3-acre woodlot in Manvers Township, Lindsay District, and at Gros Cap west of Sault Ste. Marie.

Lindsay	1	Sault Ste. Marie	2

Aspen Blotch Miner, *Lithocolletis salicifoliella* Chamb.—Small pockets of understory trembling aspen trees suffered severe leaf mining at numerous scattered locations throughout Ontario. Most extensive of these were located along Highway 120 from Aramis Lake to the eastern boundary of the Fort Frances District, and in the White Otter Lake area of the Kenora District.

Chapleau	12	North Bay	3
Cochrane	1	Port Arthur	7
Fort Frances	13	Sault Ste. Marie	2
Geraldton	9	Sioux Lookout	7
Kapuskasing	1	Sudbury	4
Kenora	20	Swastika	1
Lake Erie	2	White River	29
Lindsay	1		

Solitary Oak Leaf Miner, *Lithocolletis hamadryadella* (Clem.)—This insect was prevalent at several locations in the Lake Erie District. Severe browning of foliage was noted on white oak in Woodhouse and Caradoc townships, and on black and white oak in Rondeau Park. Leaf mining was of moderate intensity in oak stands between Port Franks and Grand Bend in Lambton County.

Kenora	1	North Bay	1
Lake Erie	5	Parry Sound	2
Lake Simcoe	1	Lindsay	2

A Spruce Needle Miner, *Epinotia nanana* Treit.—This little known needle miner damaged Norway spruce windbreaks near Delhi and at the St. Williams Forestry Farm in the Lake Erie District.

Lake Erie	2	Sault Ste. Marie	1

Jack-pine Needle Miner, *Exoteleia pinifoliella* (Chamb.)—The heavy infestations that were reported in Finch Township, Kemptville District, and Clarke Township, Lindsay District, in 1957, declined sharply in 1958. Numerous areas of light infestation were noted in the North Bay District and the northern part of the Parry Sound District, at one location in Beverley Township in the Lake Huron District, and in Bertie Township in the Niagara Peninsula.

Kemptville	5	Parry Sound	8
Lake Erie	1	Sault Ste. Marie	3
Lake Huron	5	Sudbury	3
Lake Simcoe	2	Tweed	2
Lindsay	1	White River	1
North Bay	8		

Basswood Leaf Miner, *Baliosus ruber* (Web.)—Only light browning of basswood foliage by this beetle was reported from Harvey Township, Lindsay District, indicating a sharp reduction in the intensity of attack from 1957.

Kemptville	1	Parry Sound	1
Lindsay	2		

Horned Oak Gall, *Callirhytis cornigera* (O.S.)—Cumulative gouting of pin oak by this gall wasp in conjunction with damage by a variety of insect defoliators

and leaf miners over the past 7 or more years caused severe tree mortality in the eastern half of Welland County in 1958. The pin oak component of several woodlots over an area of approximately four townships has been seriously reduced and in a few instances has been removed completely.

Lake Erie	1

White-pine Shoot Borer, *Eucosma gloriola* Heinr.—There was a marked reduction in the number of brown flags caused by this insect on Scots, red, and white pine trees in central and southern Ontario. This trend was most apparent in the Parry Sound District where percentages of trees infested based on 100-tree counts dropped to less than one-half that reported in 1957 (25 per cent to 11 per cent in McLean Township, 30 to 9 in Stisted, 23 to 12 in Macaulay). Light infestations were observed at scattered points elsewhere in southern Ontario. *Eucosma* damage to the leading shoots of jack pine persisted in the Fort Frances, Kenora, Sault Ste. Marie, and Parry Sound districts.

Fort Frances	4	Parry Sound	9
Kenora	4	Sault Ste. Marie	2
Lake Erie	5	Sioux Lookout	2
Lake Simcoe	12	Sudbury	1
Lindsay	1		

Pine Spittlebug, *Aphrophora parallela* (Say)—The number of reports from southern Ontario indicating high spittlebug populations on Scots pine plantings has increased markedly in recent years. Persistent infestations in the Lake Simcoe District have now caused 40 per cent mortality in one compartment of the Vivian Forest, an increase from 30 per cent in 1957; light mortality occurred in Uxbridge Forest. Spittlebugs were also abundant in pine plantations in the Lindsay, Lake Erie, Lake Huron, and Parry Sound districts.

Chapleau	17	Lindsay	9
Fort Frances	15	Parry Sound	6
Gogama	14	Pembroke	2
Kapuskasing	4	Sault Ste. Marie	7
Kenora	2	Sioux Lookout	1
Lake Erie	2	Sudbury	10
Lake Huron	2	Swastika	1
Lake Simcoe	10	White River	9

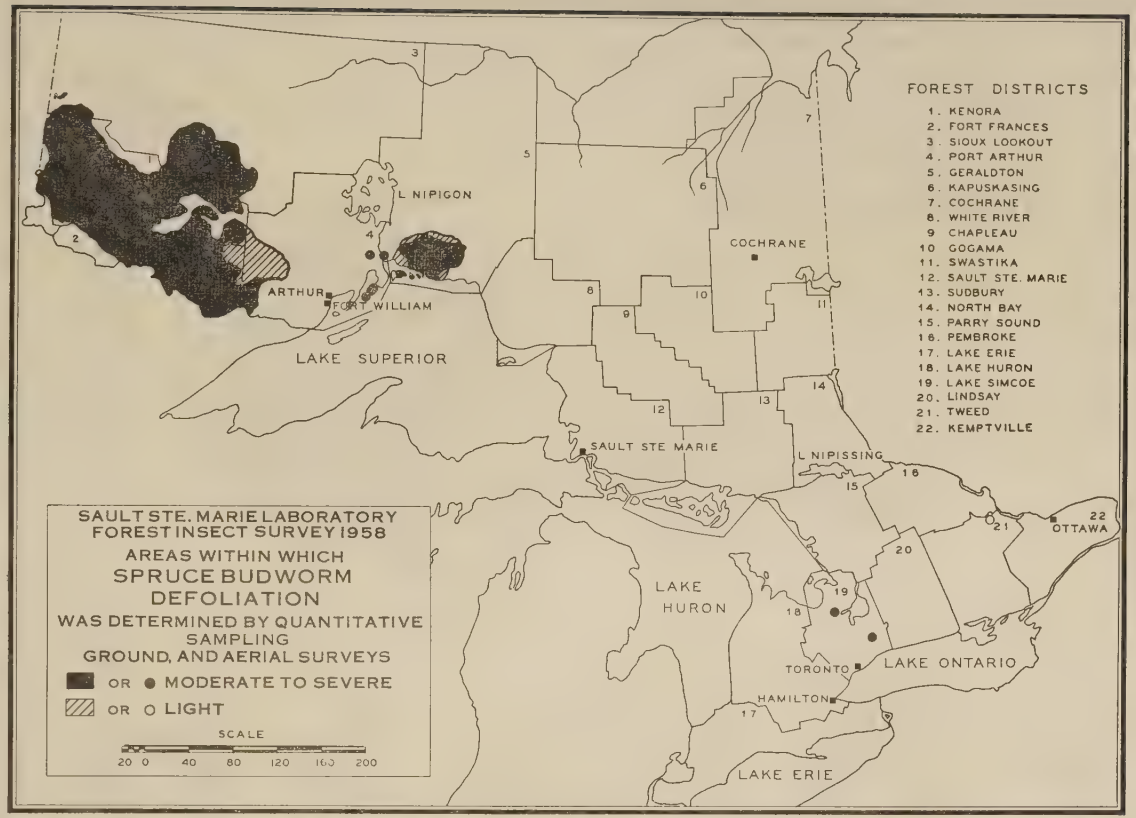
Walkingstick, *Diapheromera femorata* (Say)—As anticipated because of the biennial nature of this insect, no infestations occurred on deciduous stands where it was reported abundant in 1957. Light infestations occurred on black oak trees in Bosanquet Township and on understory plantings in the older sections of the St. Williams Forestry Farm, both situated in the Lake Erie District.

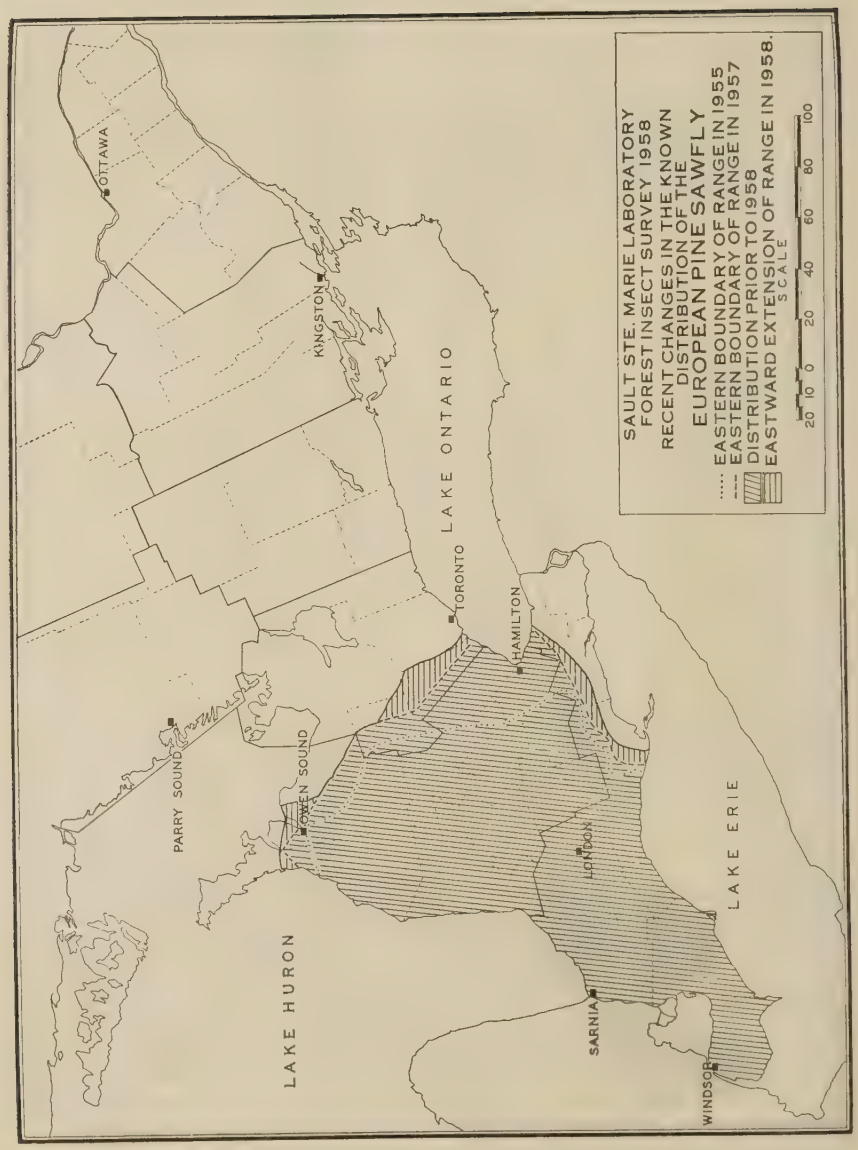
Lake Erie	5	Lake Simcoe	3
Lake Huron	2		

Pine Bark Aphids, *Pineus* spp.—Heavy infestations, characterized by the appearance of white flocculence on the trunks of white pine trees, were observed in Cartwright and Manvers townships, Lindsay District; in one area near St. Williams, Lake Erie District; in the Chesney Tract, Lake Huron District; and in the Vivian and Uxbridge forests, Lake Simcoe District. Near the last two infestations large numbers of aphids appeared in June on the new growth of red, Scots, white, and jack pines causing a slight browning of the current year's needles in late summer. The two types of damage cannot be associated with certainty due to the complex biologies of the insect or insects involved.

Lake Huron	1	Lindsay	3
Lake Simcoe	3	North Bay	2

A Spider Mite, *Oligonychus* sp.—This mite caused sudden and severe browning of red juniper foliage in the Point Pelee National Park, Lake Erie District. The use of DDT sprays for mosquito control in the area probably accounted for the outbreak by reducing its natural enemies.


FOREST DISTRICTS
1. KENORA
2. FORT FRANCES
3. SIOUX LOOKOUT
4. PORT ARTHUR
5. GERALDTON
6. KAPUSKASING
7. COCHRANE
8. WHITE RIVER
9 CHAPLEAU
10 GOGAMA
11. SWASTIKA
12. SAULT STE. MARIE
13. SUDBURY
14. NORTH BAY
15. PARRY SOUND
16. PEMBROKE
17. LAKE ERIE
18. LAKE HURON
19. LAKE SIMCOE
20. LINDSAY
21. TWEED
22. KEMPTVILLE
L NIPIGON
ARTHUR
FORT WILLIAM
LAKE SUPERIOR
COCHRANE
SAULT STE MARIE
L NIPISSING
OTTAWA
LAKE HURON
TORONTO
LAKE ONTARIO
HAMILTON
LAKE ERIE
SAULT STE. MARIE LABORATORY
FOREST INSECT SURVEY 1958
AREAS WITHIN WHICH
SPRUCE BUDWORM
DEFOLIATION
WAS DETERMINED BY QUANTITATIVE
SAMPLING
GROUND, AND AERIAL SURVEYS
OR MODERATE TO SEVERE
OR LIGHT
SCALE
20 0 40 80 120 160 200


SAULT STE. MARIE LABORATORY
FOREST INSECT SURVEY 1958
RECENT CHANGES IN THE KNOWN
DISTRIBUTION OF THE
EUROPEAN PINE SAWFLY
EASTERN BOUNDARY OF RANGE IN 1955
EASTERN BOUNDARY OF RANGE IN 1957
DISTRIBUTION PRIOR TO 1958
EASTWARD EXTENSION OF RANGE IN 1958.
SCALE
20 10 0 20 40 60 80 100
OTTAWA
KINGSTON
TORONTO
HAMILTON
LONDON
SARNIA
WINDSOR
PARRY SOUND
OWEN SOUND
LAKE HURON
LAKE ONTARIO
LAKE ERIE

PROVINCE OF ONTARIO

FOREST DISEASE SURVEY

J. Reid

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INTRODUCTION

The rather cool, moist weather prevalent in Ontario during the late spring and summer generally favored tree growth in most regions. Nevertheless, frost damage occurred during July, in local pockets, in areas as far south as Barrie.

Once again the Forest Disease Survey in Ontario stressed collections of specific diseases. These were diseases of balsam fir, spruce needle rusts, and tip and twig blight of balsam poplar and trembling aspen.

The following list shows the distribution of collections among the principal host trees. However, the Survey program cannot be fully appreciated on the basis of the collections submitted. This is particularly true of the maple survey carried out in the southwestern region of Ontario in 1958.

Coniferous Trees	Collections	Broad-leaved Trees	Collections
Balsam fir	812	Elm	1,089
Jack pine	71	Poplar	70
White pine	55	Alder	7
Red pine	25	Maple	6
Black spruce	24	Oak	4
White spruce	15	Birch	3
Scotch pine	5	Willow	2
Juniper	3	Chinese elm	2
Tamarack	2	Cherry	1
Hemlock	1	Horse chestnut	1
Mugho pine	1	Serviceberry	1
Cedar	1	American chestnut	1
Total	1,015	Total	1,187

Miscellaneous hosts..... 101

Grand Total..... 2,303

IMPORTANT DISEASES

Dutch Elm Disease—During 1958 *Ceratocystis ulmi* (Buism.) C. Moreau, the causal organism of Dutch elm disease, was isolated from 427 of 1089 samples submitted for culturing.

The accompanying map shows the number of samples from each county from which the causal fungus has been isolated since the disease was first recorded in Ontario in 1946, subdivided as follows, 1956 to 1957 and 1958.

In 1958 the organism was found in Wellington, Muskoka, and Haliburton counties for the first time. The Muskoka and Haliburton records mark a major northward extension of the disease beyond the previously known limit. Marked increases in the number of confirmed disease samples were recorded from York, Peel, Ontario, and Middlesex counties.

The increase in the York, Peel, and Ontario counties was the result of a survey carried out by the Metropolitan Toronto and Region Conservation Authority in co-operation with the Maple Laboratory. These results, however, must be regarded as a minimum expression of the disease since only trees on county and township road allowances plus a few trees on private properties in urban districts of the Authority were sampled. No sampling of the great proportion of elms that occur on private or highway property was undertaken. Undoubtedly a number of these trees were also infected.

During the year, the first positive sample since 1948 was received from Stormont County and since 1951 from Leeds County.

Canker and Dieback of Balsam Fir—Collections exhibiting the symptoms of this condition invariably yielded one of the fungous genera or species which have been previously associated with it. These were *Thyronectria balsamea* (Cke. and Lk.) Seeler in 235 collections, *Dermea balsamea* (Pk.) Seav. and its imperfect stage *Gelatinosporium abietinum* Peck in 76 collections, *Cytospora friesii* Sacc. in 52 collections, and *Cytospora abietis* Sacc. in 18 collections.

Investigations of the relationship of these organisms to the disease condition and the possible role of insects, were completed during 1958 and will be published elsewhere.

Needle Rusts of Pine and Spruce—During 1958, collections of *Coleosporium asterum* (Diet.) Syd. were secured from jack and red pine trees in the Parry Sound, Lindsay, Fort Frances, Lake Huron, Chapleau, Port Arthur, Sault Ste. Marie, Gogama, Rideau, Lake Erie, Lake Simcoe, and Pembroke districts. The incidence of this disease was much higher than in 1957, and it was particularly severe in plantations in the Lake Huron, Lake Erie, Lake Simcoe, and Lindsay districts.

Chrysomyxa ledicola Lagerh. and *Chrysomyxa ledi* de Bary were obtained from white and black spruce in the White River, Geraldon, Cochrane, Chapleau, Sault Ste. Marie, Port Arthur, Swastika, and Sioux Lookout districts. The incidence of these needle rusts generally was somewhat higher than in 1957 and quite heavy in the White River and Port Arthur districts.

Maple Dieback—The symptoms commonly associated with "dieback" of hard maple in Ontario are; (1) interveinal chlorosis, marginal browning, or even coloration strikingly like fall colors; (2) complete browning and death of the leaves, with premature leaf fall; (3) death of young twigs followed by death of part or all of the crown; and (4) killing of the leaders at an early stage on both reproduction and larger trees.

During 1958 a rather intensive survey of this condition, first noticed in 1957, was carried out in the Southwestern Region of Ontario. This survey was undertaken as a co-operative venture with the staff of the Ontario Department of Lands and Forests.

The survey covered 339 woodlots in 171 townships; trees in 272 of the woodlots exhibited symptoms of this dieback and no affected trees were noted in 67 woodlots.

Based on the stands examined, the incidence of the disease on a township basis was as follows: over 50 per cent of the trees affected—2 townships; 20 to 50 percent—14 townships; 5 to 20 per cent—63 townships; 1 to 5 per cent—44 townships; less than 1 per cent—23 townships; and no disease—27 townships.

The most seriously affected stands were in the northern part of the Lake Huron District. Severely affected stands were also found in the eastern part of the Lake Erie District, and scattered through the Lake Simcoe District.

Repeated isolations from affected trees have not yielded any organism which could be considered a primary pathogen.

Ink Spot Disease of Poplar—*Ciborinia whetzelii* (Seav.) Seav. the causal agent of this disease was reported from the Sudbury, Kemptville, Kenora, Sault Ste. Marie, Fort Frances, Parry Sound, White River, Lindsay, Geraldton, Sioux Lookout, Cochrane, and North Bay districts. Incidence was high in the Port Arthur, Sault Ste. Marie, and Fort Frances districts.

Leaf and Twig Blight of Poplar—*Fusicladium radiosum* (Lib.) Lind. is the causal organism of this disease on trembling and largetooth aspen and was reported from the Sioux Lookout, Geraldton, Gogama, Lindsay, Kenora, Pembroke, White River, Port Arthur, Chapleau, Fort Frances, North Bay, Cochrane, and Swastika districts. Incidence was high in the Port Arthur, Sioux Lookout, Lindsay, Kenora, and Geraldton districts. There has been a general increase in the occurrence of this disease in 1958, compared with 1957. *Pollaccia elegans* Serv. which causes a similar condition in balsam poplar was reported only from the Lindsay District.

OTHER NOTEWORTHY DISEASES

Host	Organism	Locality	Remarks
Balsam fir	*Cytospora friesii* Sac.	Twp. 29, Sault Ste. Marie District.	First herbarium records
		Halls Lake, Parry Sound District.	
Maple	*Ophiocordyceps clavulata* (Schw.) E. & E.	Sioux Lookout District	First herbarium record.
	Xylaria polymorpha (Pers. ex Fr.) Grev.	Swan Lake, Parry Sound District.	First herbarium host record.
Speckled alder	*Crytospora suffusa* (Fr.) Tul.	Langton Twp., Kenora District.	First herbarium record.
	Diatrypella discoidea C. & Pk. var. *alni* Cke.	McIntosh Twp., Kenora District	First herbarium record.
	Hypoxylon mammatum (Wg.) Miller	Fargie Twp., Kenora District	First herbarium record
	Melancolis thelebola (Fr.) Sacc.	Langton Twp., Kenora District	First herbarium record
	Naemospora alni Allesch.	Langton Twp., Kenora District	First herbarium record
	Valsa ambiens (Pers.) Fr.	MacNichol Twp., Kenora District	First herbarium record
Alder	*Daldinia concentrica* (Bolt.) As. & De Not.	North of the Martin River, North Bay District	First herbarium host record
	Daldinia vernicosa (Schw.) As. & De Not.	Wabigoon Twp., Kenora District	First herbarium record
	Diatrypella betulina (Pk.) Sacc.	Langton Twp., Kenora District	First herbarium record
	Exidia glandulosum Fr.	Van Horne Twp., Kenora District, Bending Lake, Kenora District	First herbarium record
Yellow birch	*Eutypella angulosa* (Nits.) Sacc.	Dorset, Parry Sound District	First herbarium record
	Valsaria inseliva As. & De Not	P.F.E.S., Pembroke District	First herbarium record
White birch	*Cryptosporium neesi* Cda. var. *betulinum* Sacc.	Dwight, Parry Sound District	First herbarium record
European beech	*Libertella* sp.	Oakville, Lake Huron District	First herbarium host record
Beech	*Ascotremella faginea* (Peck.) Seav.	Swan Lake, Parry Sound District	First herbarium record
Black ash	*Sphaerographium fraxini Sacc.*	P.F.E.S., Pembroke District	First herbarium record
Red pine	*Valsa pini* (A. & S.) E. & E.	Kindiogami Lake, Sault Ste. Marie District	First herbarium record

OTHER NOTEWORTHY DISEASES—Concluded

Host	Organism	Locality	Remarks
Balsam poplar.....	*Linospora tetraspora* Thompson	Clute Twp., Cochrane District, Parliament Twp., Cochrane District	First herbarium record
Cherry.....	*Daldinia vernicosa* (Schw.) As. & De Not.	Kindiogami Lake, Sault Ste. Marie District	First herbarium host record
	Dermea cerasi (Pers. ex Fr.) Groves	Doghole Bay Road, Sioux Lookout District	First herbarium record
Red oak.....	*Dothiorella advena* Sacc.	Long Twp., Sault Ste. Marie District	First herbarium record
	Nummularia clypeus (Schw.) E. & E.	Hamilton, Lake Huron District	First herbarium record
American mountain ash	*Eutypella sorbi* (Fr.) Sacc.	Common Twp., White River District	First herbarium record

LAKE HURON
PARRY SOUND
MUSKOKA -2
HALIBURTON -1
OWEN SOUND
VICTORIA 1-
LENNOX AND ADDINGTON 1-
FRONTENAC 1-1
LEEDS 2-1
GRENVILLE 1-
DUNDAS 1-
STORMONT 3-1
GLENGARRY 2-
RUSSELL 1-
CARLETON 49-5
OTTAWA
PRESCOTT 1-
KINGSTON
PRINCE EDWARD 2-
DURHAM 7-10
ONTARIO 1-39
YORK 34-237
PEEL 7-63
TORONTO
LAKE ONTARIO
HALTON 6-6
WATERLOO -3
HAMILTON
WENTWORTH 40-5
LINCOLN 34-
WELLAND 67-10
HALDIMAND 3-1
BRANT 2-7
OXFORD 8-
MIDDLESEX 20-35
LONDON
SARNIA
LAMBTON 11 4
NORFOLK 5
ELGIN 10 1
KENT 44 1
WINDSOR
ESSEX 361-6
LAKE ERIE
MAPLE LABORATORY
FOREST DISEASE SURVEY 1958
KNOWN DISTRIBUTION BY COUNTY OF
DUTCH ELM DISEASE
IN ONTARIO
INFECTED TREES 67 - 10
1946-1957 - 1958
SCALE
20 10 0 20 40 60 80 100

PROVINCES OF MANITOBA AND SASKATCHEWAN

FOREST INSECT SURVEY

R. M. Prentice and V. Hildahl

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INTRODUCTION

Damage to forest trees by insects was much less striking than that caused by unusual weather conditions. The latter were characterized by drought throughout the winter and spring, high temperatures and winds in late March and April, and temperatures as low as 7.4°F. in late April. The foliage of most conifers suffered severe "winter drying". The freezing temperatures in late April caused additional damage to developing buds and foliage. Damage to current foliage was most apparent on balsam fir and trembling aspen. Many aspen stands failed to put out more than 10 per cent of their normal foliage, and this did not appear until late June. The effect of weather on host trees was very apparent at 45 permanent phenological stations where growth and development records are taken annually on white spruce, balsam fir, jack pine, trembling aspen and tamarack. At intermediate points weather injury was recorded during ground and aerial surveys. The general distribution of forest stands showing the effects of weather is plotted on an accompanying map. Throughout the affected area starvation was considered a major mortality factor. This was especially true of the spruce budworm and the large aspen tortrix, as described in the accompanying text.

Major pests which showed considerable reduction in infestation intensity were the fall cankerworm and the jack-pine budworm. Species showing little change in severity of attack or increasing in 1958 were the larch sawfly, the forest tent caterpillar, and the cottony maple scale.

Studies in 1958 were again directed towards the identification and description of immature forms of forest insects, and the refining of sampling and damage appraisal techniques for the larch sawfly, fall cankerworm, boxelder twig borer, and white grubs. Aerial surveys along the Manitoba–Ontario andSaskatchewan - Alberta boundaries were conducted in cooperation with forest biology rangers from adjoining Survey regions. This led to better interpretation and appraisal of infestations of the larch sawfly and the spruce budworm which are common to these regions. Approximately 80 hours of flying were used in the course of field work.

The number of samples received at the Laboratory totalled 3,208. Of these, 3,114 were collected by forest biology rangers, and 94 by co-operators. In addition, 115 inquiries were received from the Greater Winnipeg area; many concerned "winter drying" of ornamental conifers. Other problems in order of apparent importance were, the pine needle scale, spruce spider mite, cottony maple scale, and gall aphids on spruce. The numbers of collections from the principal host trees were as follows:

Coniferous trees	Collections
White spruce	458
Jack pine	424
Tamarack	267
Black spruce	101
Lodgepole pine	93
Scots pine	31
Other coniferous trees	8
Total	1,382

Broad-leaved trees	Collections
Trembling aspen	957
Willow	222
Manitoba maple	143
White birch	111
Chokecherry	99
Balsam poplar	94
Speckled alder	62
Green ash	22
White elm	14
Bur oak	9
Other broad-leaved trees	38
Total	1,771

Miscellaneous hosts	55
Grand Total	3,208

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—Aerial surveys of spruce budworm infestations in Manitoba and Saskatchewan were extended, and required about 34 hours of flying. As outlined in the 1956 Report, infestation ratings were based on the degree of discoloration of foliage due to budworm feeding. It was recognized early in the season that budworm damage could be confused with the reddening of foliage in eastern Manitoba due to "winter drying", so preliminary surveys were made in June to familiarize observers with this condition. It was generally agreed that the bright red colour of all old foliage typical of "winter drying" could be readily distinguished from the somewhat lighter reddening of current foliage caused by budworm feeding.

In the Eastern District of Manitoba there was a general decline of the budworm infestation, particularly along the Wanipigow and Manigotagan watersheds. It was through this area that host trees suffered heavy damage due to "winter drying" and frost. Budworm larvae that survived the winter undoubtedly were affected by the lack of suitable food during the early larval period. Small areas of moderate defoliation still persisted at Garner, Family, and Moar Lakes, and in the north at the mouths of the Pigeon and Berens rivers. High population levels were again reported on Hecla Island in Lake Winnipeg and through the St. George Lake area in the Interlake region. In the Southern District of Manitoba a reduction in budworm numbers was apparent. Light defoliation occurred from Hadashville east to the Manitoba-Ontario boundary and through the Spruce Woods Forest Reserve.

The decline in budworm population levels in southeastern Manitoba was offset by further extensions of the infestation at Namew Lake, which lies somewhat north of the area affected by spring frosts. In 1958 the infestation extended east to Rocky Lake and north to Schist Lake in Manitoba, and west to Amisk Lake in Saskatchewan. This involves an area of approximately 640 square miles in which scattered stands of white spruce and balsam fir were moderately defoliated.

White spruce trees over an area of about 4 square miles were severely infested in the Cypress Hills Provincial Forest in southwestern Saskatchewan. This is the second consecutive year the budworm has occurred in high numbers in this area.

Permanent study plots along the west shore of Lake Winnipeg were retallied in 1958. As forecast in the 1957 Report, balsam fir stands in this area have shown rapid deterioration during the past year and up to 95 per cent mortality has been recorded. The condition of host trees in this area was no doubt aggravated by severe "winter drying" and frost damage of foliage.

The results of egg mass sampling on balsam fir shown in the following table are indicative of the decline in budworm numbers in eastern Manitoba.

Location	Infestation Ratings			Population Records	
	Infestation forecast for 1958	Actual defoliation in 1958	Infestation forecast for 1959	Calculated no. of egg clusters per 100 sq. ft. of balsam fir foliage	
				1957	1958
Eaglenest Lake	moderate	nil	nil	110	0
Garner Lake	moderate	moderate	nil	54	0
Bushy Lake	light	nil	nil	0	0
Manigotagan Lake	moderate	light	light	65	8
Wanipigow Lake	severe	nil	nil	176	0
Pine Dock	severe	severe	light	298	23
Bird River	light	light	nil	25	0
Dorothy Lake	light	light	nil	0	0
Winnipeg River	severe	light	nil	232	0
Falcon Lake	light	light	light	13	21
Sandilands F.R.	light	nil	nil	28	0
East Braintree	light	nil	nil	11	0
Moose Lake	moderate	nil	nil	55	0

Defoliation at most sampling points was considerably less than that forecast on the basis of egg counts last fall. This can probably be attributed to unusually high larval mortality during the winter and early spring. Egg counts were negative at most points and relatively low at others, so negligible to light defoliation is expected in 1959.

The following table shows the occurrence of spruce budworm larvae in collections from spruce and balsam fir during the period of larval activity.

District	Collections from spruce and balsam fir	Percentage of collections containing spruce budworm
Manitoba		
Southern	14	42.4
Eastern	95	60.0
Northern	22	51.1
Western	58	42.2
Saskatchewan		
Hudson Bay	7	9.8
Prince Albert	2	4.1
Meadow Lake	0	0.0
Northern	0	0.0
Southern	13	26.0
West-central	4	18.0

Jack-pine Budworm, *Choristoneura pinus* Free.—Infestations of the jack-pine budworm in the Sandilands and Spruce Woods forest reserves subsided in 1958. The sharp decline in numbers was associated with reduced flower production on host trees. Following 2 years of heavy attack in 1956 and 1957, delayed mortality of Scots pine was striking in plantations in the Spruce Woods Forest Reserve, where some 30-year-old plantings in the Reserve are now considered a complete loss.

A slight increase was noted in the Stead–Belair area in southeastern Manitoba, but defoliation was still generally light. The budworm was found in very low numbers throughout the old infestations in the Fort a la Corne and Nisbet provincial forests in Saskatchewan.

The following table shows the occurrence of budworm larvae in collections from pine during the period of larval feeding.

District	Collections from jack, lodgepole, and Scots pine	Percentage of collections containing jack-pine budworm
Manitoba		
Southern	32	47.0
Eastern	32	29.6
Northern	0	.0
Western	0	.0
Saskatchewan		
Hudson Bay	0	.0
Prince Albert	14	10.6
Meadow Lake	0	.0
Northern	0	.0
Southern	1	3.7
West-central	0	.0

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—There were no appreciable changes in the status of the larch sawfly in 1958. As shown on the accompanying map the most extensive and severe infestation area is still centred north of the Churchill River Basin in northern Saskatchewan. Infestations of the sawfly in inaccessible areas are based on ocular defoliation estimates during aerial surveys. It has been recognized in the past that such estimates are frequently biased by factors such as poor foliage production and mortality from flooding in tamarack bogs. In 1958 a study was undertaken aimed at refining the classification of infestations. Critical observations from the air were checked from the ground at a number of points. This study will continue next year and should lead to a more standard and acceptable classification of infestations in northern areas.

Egg sampling was again carried out in all permanent tamarack study plots. The data summarized below show infestation trends for the past two years based on average counts for plots in various forest districts.

Forest District	Number of sample plots	Average percentage of current shoots utilized for oviposition	
		1957	1958
Manitoba			
Southern	4	4.1	1.7
Eastern	8	3.0	3.5
Western	8	1.0	1.6
Northern	4	1.7	1.5
Saskatchewan			
Hudson Bay	4	.8	.7
Prince Albert	6	1.6	2.3
Northern	4	3.0	3.6
Meadow Lake	4	.8	1.9

Although defoliation remained generally light through southern Manitoba and Saskatchewan, moderate to severe defoliation was recorded in a few bogs in the Whiteshell and Sandilands forest reserves. High population levels were noted on small tamarack growing on the fringe of swamps in the RidingMountain National Park.

Eastern Larch Beetle, *Dendroctonus simplex* Lec.—The occurrence of this species in some tamarack stands has been noted each year since 1956. It had been recorded in the Prince Albert District, Saskatchewan, it also has been noted by L. D. Nairn in 1957 and 1958 in permanent study plots of the Whiteshell Forest Reserve, Manitoba. In the latter area the beetle attack has been confined to the root collar, whereas in other areas the attack extended from the root collar to the lower crown. Active infestations were noticed at several points in 1958 including Buffalo Narrows, Meadow Lake, and Pierceland in northwestern Saskatchewan. Fifty trees examined at Buffalo Narrows yielded

the following results: Living—56 percent; dead prior to 1958 from unknown causes—28 per cent; died in 1958 from unknown causes—6 percent; died in 1958 from *Dendroctonus* attack—10 percent.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)—An extensive outbreak of the large aspen tortrix, which had covered most of the aspen grove region of Manitoba and Saskatchewan, subsided in 1958. The decline of the outbreak is attributed to unusually low spring temperatures during the period of early larval activity. Larvae that had left their overwintering hibernacula by mid-April were exposed to temperatures as low as 7°F. Most of the aspen foliage and buds were destroyed by the same weather conditions and refoliation did not occur in some areas until early June. As overwintering hibernacula showed very high spring emergence of larvae, it is clear that high mortality of larvae was caused either by the direct effect of frost or indirectly by starvation. In the Southern and Eastern districts of Manitoba and most of southern Saskatchewan, only very light defoliation by the aspen tortrix was recorded. In some areas where aspen was completely stripped last year it was impossible to find a single larva. In the Western District of Manitoba the only extensive area of severe defoliation occurred along the southern slopes of the Duck Mountain Forest Reserve.

The outbreak did continue in the Hudson Bay District of Saskatchewan and was centred along the western boundaries from Beaver Hills north to Kelvington. Aspen throughout most of the central portion of the Prince Albert District, north to Whiteswan Lakes was again severely defoliated. In this district the forest tent caterpillar was frequently found together with the large aspen tortrix.

The following table shows the occurrence of aspen tortrix larvae in collections from trembling aspen during the period of larval activity.

Districts	Collections from trembling aspen	Percentage containing large aspen tortrix
Manitoba		
Southern	4	7.8
Eastern	33	33.3
Northern	9	23.7
Western	52	41.8
Saskatchewan		
Hudson Bay	63	58.8
Prince Albert	57	37.5
Meadow Lake	29	33.1
Northern	16	51.6
Southern	60	32.5
West-central	41	95.3

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.—Increases in the numbers of forest tent caterpillars were evident in most districts, particularly throughout the aspen grove region of the two provinces. As forecasted in 1958, trembling aspen in the east and central blocks of the Cypress Hills Provincial Forest was completely defoliated. In the Prince Albert and Hudson Bay districts it was usually found in association with the large aspen tortrix, and at a number of points the two species caused moderate defoliation.

In view of the apparent increase in distribution and abundance of tent caterpillars, an egg survey was conducted in the fall of 1958. At each sampling station, three co-dominant trees were felled and examined for egg bands. The following table summarizes sampling records and gives defoliation forecasts for 1959.

Region	No. of sampling stations	No. of stations at which egg bands were recovered	Average No. of egg bands per tree	Defoliation forecast
Manitoba—				
Western District	22	5	0.5	light
Saskatchewan—				
Southern District	26	9	0.9	light
Cypress Hills P.F.	18	16	22.0	severe
Prince Albert N.P.	11	5	0.8	light
Prince Albert District	22	5	0.5	light
Hudson Bay District	13	4	0.8	light

White Grubs, *Phyllophaga* spp., *Serica intermixta* Blatch.—An infestation of white grubs and damage to pine transplants in afforested areas in southeastern Manitoba was outlined in the 1957 Report. Plantings in 1958 were suspended until more is known about control measures.

Soil samples to a depth of 1 foot were taken at 80 points in 1958 and the average number of grubs per square foot of soil surface was 3.3 which is 1.8 higher than in 1957. About 58 per cent of the grubs were first-year larvae confirming that 1958 was a major flight year.

Assessment of grub populations is difficult because the immature stages of the various species cannot be identified. Larvae are now being described and reared for final identification.

White grub surveys were extended to other planting areas. In the Riding Mountain National Park, up to 6 grubs per square foot were found in white spruce plantings. Sampling was also done in pine plantings in the Big River Provincial Forest in Saskatchewan, but no white grubs were found.

Root Weevils, *Hylobius warreni* Wood and *Hylobius pinicola* (Couper)—A survey was carried out in all major forest districts of the two provinces to assess damage to spruce caused by these species. Areas selected for sampling were usually wet sites, which are known to favour the occurrence of the weevils. At each area the roots and root collars of 5 living and 5 dead trees were examined and a damage index ranging from 0 to 10, as described by Warren*, was recorded for each tree. Average indices for living and dead trees are shown by districts in the following synopsis:

Forest District	No. of areas sampled	Average Damage Index	
		living trees	dead trees
Manitoba			
Southern	3	0.5	0.1
Eastern	4	0.6	0.3
Western	2	2.5	7.1
Northern	2	2.1	6.6
Saskatchewan			
Hudson Bay	2	4.2	6.4
Prince Albert	4	2.7	2.4
Northern	1	0.6	0.8
Meadow Lake	2	2.4	2.7
Southern	1	0.0	0.9

*Warren, G. L. The Effect of Some Site Factors on the Abundance of *Hypomolyx piceus* (Coleoptera: Curculionidae). Ecology 37:132-139. 1956.

Because damage to the root systems is cumulative the indices shown above do not necessarily reflect current populations of the weevils. The 1958 survey indicates that the higher indices occur in the Northern, Prince Albert, and Hudson Bay districts.

Pine Root Collar Weevil, *Hylobius radicis* Buch.—The distribution of this species is still restricted to pine plantations in the Sandilands Forest Reserve. Records on tree mortality in infested plantings were summarized in the 1957 Report. In 1958 a survey was made of all pine plantings within a 4-mile radius of the known infestation. The results are summarized in the following table.

Tree Species	No. of plantations examined	Number infested	Percentage of trees			
			Infested		Dead	
			Rge.	Av.	Rge.	Av.
Scots pine	5	5	28–100	50	5–40	12
Red pine	3	1	0–5	3	0	0

The results indicate that the infestation in the Sandilands Forest Reserve is gradually extending. Red pine is only occasionally attacked, but increased mortality in recently infested Scots pine plantations can be expected in 1959.

Fall Cankerworm, *Alsophila pometaria* (Harr.)—Infestations of cankerworms declined throughout most of Manitoba, particularly in the Winnipeg and Portage la Prairie areas. Light to moderate defoliation was reported from near Dauphin and Swan River, where severe infestations occurred in 1957. Shelterbelts of Manitoba maple were completely defoliated in the Swift Current–Success area in western Saskatchewan and near Moosomin, Grenfell, Melville, and Abernethy in the eastern part of the Province.

Boxelder Twig Borer, *Proteoteras willingana* (Kft.)—Counts at sampling points in southern Manitoba and Saskatchewan indicate a further decline in the abundance of this species. A downward trend in numbers has been apparent for the past 3 years. The following table summarizes sampling records for the past 2 years.

Forest District	No. of sample points	Average percentage of twigs infested	
		1957	1958
Manitoba			
Southern	8	8	3
Saskatchewan			
Southern	7	15	4
West-central	10	14	4
Meadow Lake	8	2	1

White-pine Weevil, *Pissodes strobi* (Peck)—There was an increase in the incidence of this weevil in collections from black spruce, white spruce, and jack pine. Along the Armit River in the Hudson Bay District about 60 per cent of the leaders of young white spruce trees were heavily attacked. A rather unusual outbreak was recorded in a jack pine plantation at Buckland, Saskatchewan, where certain variations in habit were noted. Only one individual was found per infested leader.

Pine Tortoise Scale, *Toumeyella numismaticum* (P. & M.)—No important infestations of this scale were reported in 1958, although it was frequently found on jack pine trees in the Eastern District of Manitoba, and the Hudson Bay and Prince Albert districts of Saskatchewan. An increase in the incidence of scale has been noticed in the latter two districts in recent years.

	Collections
Manitoba	
Southern	3
Eastern	13
Northern	1
Western	1
Saskatchewan	
Hudson Bay	9
Prince Albert	22

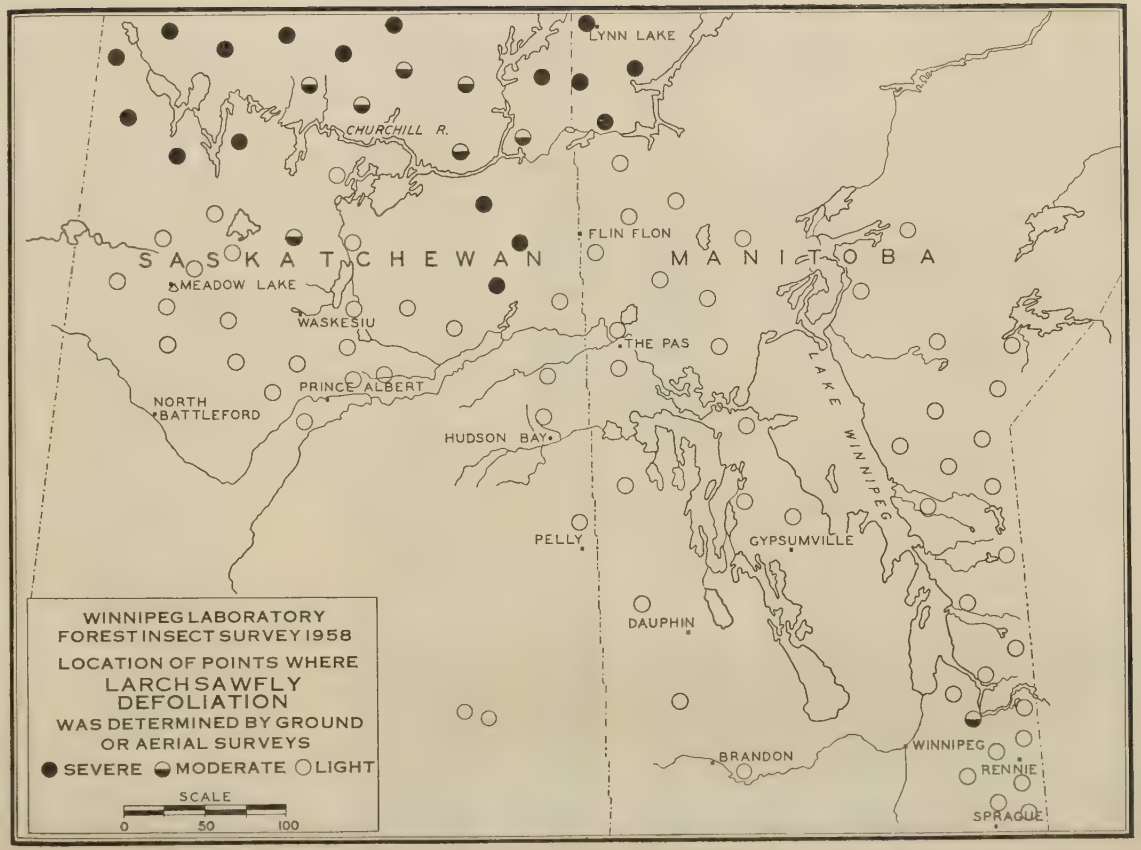
Cottony Maple Scale, *Pulvinaria innumerabilis* (Rathv.)—An outbreak of this scale occurred on Manitoba maple at Winnipeg. This is the first known record of the insect occurring in high numbers in this area. Nymphal feeding throughout the summer caused conspicuous wilting of foliage at many points. The literature indicates that outbreaks rise very suddenly and usually are of short duration.

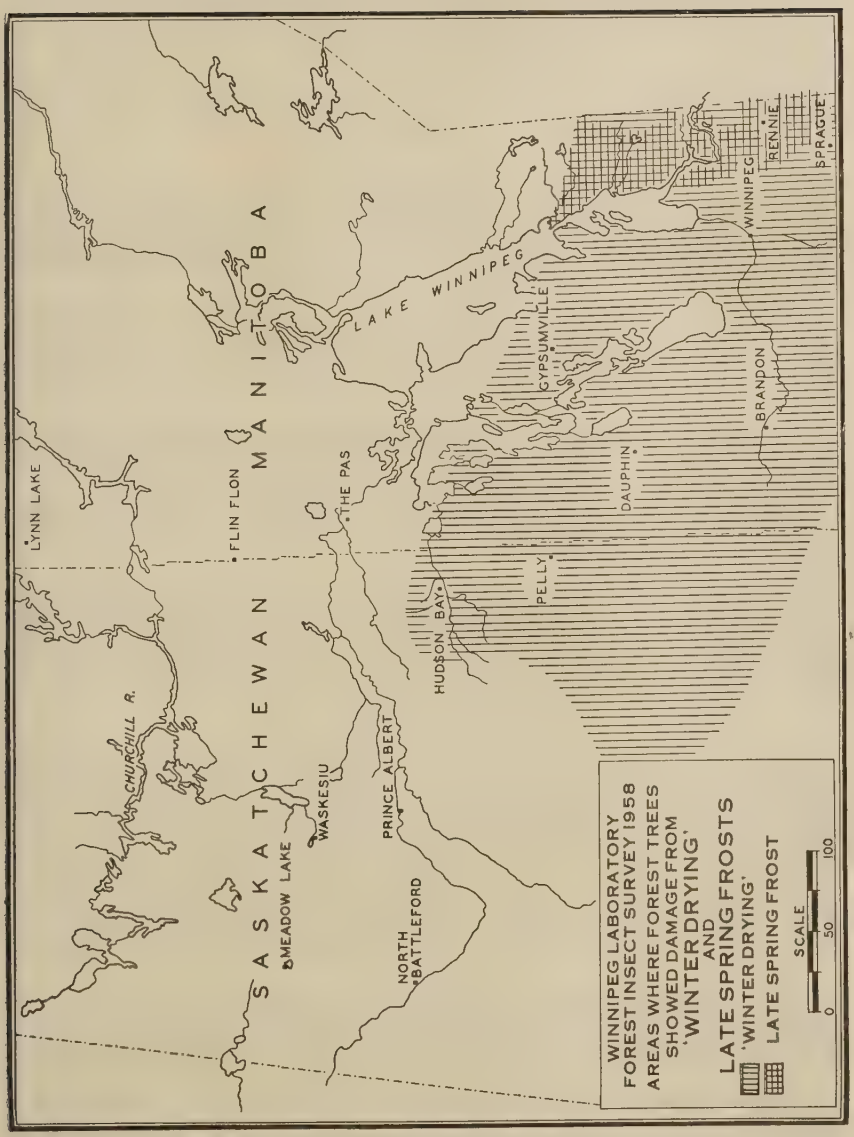
European Fruit Lecanium, *Lecanium coryli* L.—A decline in the numbers of this scale on planted elms in parks in Regina was evident where chemical control measures had been applied. At other points in the City and at the Indian Head Experimental Farm the scale was again reported in high numbers.

Pitch Midges, *Retinodiplosis* spp.—Two species of midges, as yet not positively identified, were collected at 20 localities, but only in small numbers. Infestations reported last year at Stead and Belair subsided in 1958. This was largely due to high mortality in the larval stage. Only 1 per cent of the current shoots showed evidence of attack by midges in the main study area in 1958.

Yellow-headed Spruce Sawfly, *Pikonema alaskensis* (Roh.)—Infestations were limited to shade and shelterbelt trees in the Kenosee Lake and Goodeve areas in the Southern District of Saskatchewan. A decline in numbers was noted in other areas of the two provinces.

Pine Needle Scale, *Phenacaspis pinifoliae* Fitch.—The pine needle scale was a common pest on ornamental spruce in the Southern districts of Manitoba and Saskatchewan. High population levels in most parks in the Winnipeg area caused discolouration of foliage, and chemical control measures were applied at many points. The spruce spider mite, *Oligonychus ununguis* (Jac.) was frequently found together with the scale.


LYNN LAKE
CHURCHILL R.
FLIN FLON
SASKATCHEWAN
MANITOBA
MEADOW LAKE
WASKESIU
THE PAS
PRINCE ALBERT
NORTH BATTLEFORD
HUDSON BAY
LAKE WINNIPEG
PELLY
GYPSUMVILLE
DAUPHIN
BRANDON
WINNIPEG
RENNIE
SPRAGUE
WINNIPEG LABORATORY
FOREST INSECT SURVEY 1958
LOCATION OF POINTS WHERE
LARCH SAWFLY
DEFOLIATION
WAS DETERMINED BY GROUND
OR AERIAL SURVEYS
SEVERE MODERATE LIGHT
SCALE
0 50 100


SASKATCHEWAN
MANITOBA
LAKE WINNIPEG
LYNN LAKE
FLIN FLON
THE PAS
CHURCHILL R.
MEADOW LAKE
WASKESIU
PRINCE ALBERT
NORTH BATTLEFORD
HUDSON BAY
PELLY
GYPSUMVILLE
DAUPHIN
BRANDON
WINNIPEG
RENNIE
SPRAGUE
WINNIPEG LABORATORY
FOREST INSECT SURVEY 1958
AREAS WHERE FOREST TREES
SHOWED DAMAGE FROM
'WINTER DRYING'
AND
LATE SPRING FROSTS
'WINTER DRYING'
LATE SPRING FROST
SCALE
0
50
100

PROVINCES OF MANITOBA AND SASKATCHEWAN

FOREST DISEASE SURVEY

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INTRODUCTION

Satisfactory progress is being made in a Forest Disease Survey policy that aims to concentrate the attention and efforts of Survey personnel on specific diseases and associated conditions, and to avoid indiscriminate and unprofitable collecting of fungi of all kinds regardless of their importance.

Considerable information has been accumulated which serves to strengthen previous reports on the geographic range of numerous diseases, notably, jack-pine mistletoe and its fungous parasite *Wallrothiella arceuthobium* (Pk.) Sacc., spruce mistletoe, Hypoxylon canker of poplar, and yellow witches' broom of spruce.

A systematic sampling procedure has been adopted to get specific information on the distribution and incidence of root and butt rots in spruce, especially those caused by *Polyporus tomentosus* Fr. and *Flammula alnicola* (Fr.) Quél.

White-pine blister rust was discovered in southeast Manitoba, the only place where eastern white pine occurs in the Prairie Provinces. This will be a subject for special attention in 1959.

Symptoms such as diebacks are attributed to many factors, an important one being weather. Low temperatures were responsible for various and unusually noticeable symptoms in 1958. Unseasonably warm early spring weather, followed by a return to winter conditions, is believed responsible for death of twigs and buds in many species of conifers and hardwoods.

IMPORTANT DISEASES

Root and Butt Rot of Spruce—A special survey project was begun in 1958 in connection with spruce root diseases being studied at the Saskatoon Laboratory. The objective was to locate affected stands of white and black spruce, and to determine the incidence and kinds of root rots. This project proved successful and will be continued in 1959. Of the 18 stands sampled, 17 yielded *Polyporus tomentosus* root rot. *Flammula alnicola* (Fr.) Kummer, another root and butt rot fungus that is important in some regions, was not found. Very few sporophores of the above fungi were found in 1958 by either the Survey or the research parties, probably owing to the dryness of the season.

White-pine Blister Rust—This destructive canker disease has at last invaded the most western stand of eatern white pine in Canada. The first collections were made at Moose Lake, Manitoba, in 1958, but the distribution of the disease in Manitoba is not yet known. A special survey is planned for 1959.

Environmental Troubles—In both Provinces winter injury and spring frost injury to softwoods and hardwoods were common in 1958, particularly in southeastern Manitoba. Balsam fir, jack pine, white and black spruce, Colorado spruce, green ash, aspen, maple, tamarack, elm, caragana, birch, hazelnut, and

willow were affected. Winter browning or winter drying of conifers was particularly conspicuous in 1958. In late May and early June, frost did much damage especially to buds, twigs, and young leaves of broadleaf trees; healthy lateral buds below the killed upper portions of the branch produced abnormal clusters resulting in a broomed appearance. Frost killing symptoms were of four types: Bud-killing characterized by terminal buds that failed to open, bud-killing characterized by partially opened buds that were killed by frost, twig diebacks with buds killed in the dormant stage or later stage of opening, and killing of early leaves such as that noticed on elm, ash, plains cottonwood, and tamarack seedlings.

Canker Diseases of Elm—Cankers on planted elms are commonly caused by fungi, such as *Cytospora* sp., *Tubercularia* sp., and *Coniothyrium* sp. Throughout the region where cankers are common there also occurs a dieback, the cause of which is difficult to diagnose. The fungi associated with the cankers are more troublesome on trees on poor sites or outside of their natural range.

Jack-pine Mistletoe—Collections of jack-pine mistletoe and its parasite, *Wallrothiella arceuthobium*, from Rene Lake, Saskatchewan, and from near Mink Narrows, Manitoba, extend the known range of both organisms as reported in 1956.

Spruce Needle Rust—This disease, caused by *Chrysomyxa ledicola* Lagerh., has continued to decline since the severe epidemic in 1954.

Yellow Witches'-Broom of Spruce—Over the past few years numerous reports of this disease in the Boreal region of Saskatchewan and Manitoba strengthen the earlier conclusion that it is present throughout the range of the host.

Decline in Tamarack—The larger tamarack trees (3 to 8 inches D.B.H.) in affected stands south and east of Cold Lake were reported dying in appreciable numbers. An examination of two stands near Loon Lake and Pierceland confirmed this report. In all dead trees examined, the typical mycelial fans of *Armillaria mellea* (Vahl ex Fr.) Quél. were found on roots near the butt of the tree, and it appeared that this root rot and girdling fungus had caused the death of the trees. In all instances, one or more other factors had contributed to the decline of the trees and consequently predisposed them to attack by this fungus; notable were selective cutting operations, high water, and browsing. Dense reproduction had been heavily browsed, and many trees had been cut at a height of about 30 inches, apparently by beavers. Many of these young trees were dead, and *Armillaria* was conspicuous in the root collar of all those examined. There is reason to suspect that this fungus is common in tamarack stands, ready to attack trees that offer favourable conditions.

Balsam-fir Twig Blight—A blight of balsam fir twigs at Atikameg Lake, Manitoba, attracted some interest; the cause has not been determined, and further observations and collections are needed.

Stem Rusts of Jack Pine—Cankers of jack pine are common throughout Saskatchewan and Manitoba, and are caused by *Cronartium comandrae* Peck, *Cronartium comptoniae* Arth., and *Peridermium* sp., known respectively as comandra blister rust, sweet-fern blister rust, and globose gall rust. The globose gall rust is similar to western gall rust or Woodgate rust caused by *Peridermium harknessii* J. P. Moore which has several genera of Scrophulariaceae for alternate hosts. *Peridermium* sp. is of particular interest because its alternate stage has not been found in Saskatchewan or Manitoba.

PROVINCE OF ALBERTA

FOREST INSECT SURVEY

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INTRODUCTION

An abundance of poplar feeding insects characterized the 1958 field season in Alberta. Three species of leaf rollers, three species of lepidopterous defoliators and a number of species of leaf eating beetles were prevalent throughout the aspen zone. The leaf rollers, although conspicuous, were responsible for little damage. Bruce spanworm was responsible for a great deal of defoliation south of the North Saskatchewan River and isolated patches of defoliation farther north. The forest tent caterpillar increased in numbers and, although there were few reports of severe defoliation, it was present over a much larger area than in 1957. The American poplar beetle and the grey willow beetle, along with several other species, were frequently associated with one or more of the lepidopterous defoliators or leaf rollers.

An increase in aerial survey time resulted in a more comprehensive survey of the larch sawfly than has been possible in the past. As indicated in the accompanying map, larch sawfly infestations in Alberta increased both in size and intensity in 1958. With the exception of the northwestern quarter of the Province most tamarack stands were infested and over approximately 65,000 square miles the trees were heavily defoliated. Moderate spruce budworm infestations were recorded from the Slave River in northeastern Alberta, from a tributary of the Wabiskaw in north central Alberta and from the Cypress Hills in the extreme southeast. The infestation along the Mackenzie River was not visited in 1958.

Activities in the Northwest Territories were confined to helicopter and aeroplane surveys out of Fort Smith and road travel along the Mackenzie Highway and the new highway to Fort Providence.

There were 2,086 collections and reports received by the Laboratory. The assistance and co-operation of provincial, federal and industrial personnel is gratefully acknowledged. The number of collections from the principal tree hosts were:

Coniferous trees	Collections	Boroad-leaved trees	Collections
Spruce	470	Trembling aspen	506
Pine	252	Willow	201
Larch	250	Poplar	92
Fir	41	Birch	39
Douglas fir	14	Manitoba maple	55
Cedar	1	Elm	10
		Ash	10
Total	1,028	Total	913

Miscellaneous hosts..... 145

Grand Total..... 2,086

IMPORTANT INSECTS

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—The larch sawfly was the most destructive and widely distributed forest insect in Alberta in 1958. The infested area extended from 15 miles north of Fort Smith, N.W.T., to the Kananaskis Forest Experiment Station, 50 miles west of Calgary. In the central part of the Province it extended from the Saskatchewan boundary to the British Columbia boundary. The results of aerial and ground coverage are shown in the accompanying map.

The largest area of severe defoliation occurred in the low lying land in the northeast part of the Province from the Wabiskaw River to the Saskatchewan boundary and from Wabiskaw Lake to beyond Fort Smith, N.W.T. Defoliation moderated in the centre of this infestation above the 2,000 ft. contour of the Birch Mountains, where old burns and sites favourable to spruce and pine greatly reduced the percentage of tamarack.

Another large area of severe defoliation occurred from Edmonton north to Fawcett Lake extending from Whitecourt on the west to Lac La Biche on the east. West and north of Cold Lake, light, moderate, and heavy defoliation occurred in a patch-work pattern. Aerial defoliation estimates in this area were less precise than farther north because defoliation from previous years caused such a reduction in needle growth that it was impossible to separate trees with very short needles from those severely defoliated. Heavy defoliation was reported from Rocky Mountain House east to Sylvan Lake and in a small patch near Sundre.

A fringe of moderate to light defoliation surrounded these major outbreak areas. A large area of light defoliation was also present along the eastern slopes of the Rockies from a few miles south of the Red Deer River to beyond the Little Smoky, extending north and east to join with the more heavily defoliated area north of Edmonton. In the Peace River region infestations were spotty. One area of severe defoliation was reported from near Watino and several small areas of moderate defoliation were reported north of the Peace River; elsewhere defoliation was light.

A light infestation of larch sawfly occurred on planted larch at the Kananaskis Forest Experiment Station. This is the most southerly infestation in the forested area of Alberta and is about 50 miles beyond the southern extension of tamarack.

The results of sequential sampling are given in the following table. An increase in the number of shoots used for oviposition was recorded in 7 plots, a decrease in 3. The remainder were in the same infestation class as in 1957.

Location	Infestation class		Location	Infestation class	
	1957	1958		1957	1958
High Level	light	light	Barrhead	moderate	severe
Kegg River	light	nil	Obed	nil	nil
Clear Prairie	—	moderate	Gainsford	moderate	moderate
Grimshaw	nil	nil	Edmonton	severe	severe
Watino	light	severe	Peers Turnoff	nil	nil
Grouard	nil	light	Entrance	nil	nil
Slave Lake	light	moderate	Miette	nil	—
Calling Lake	light	moderate	Mercoal	nil	nil
Grande Prairie	light	light	Millet	severe	moderate
Lac La Biche	moderate	moderate	Winfield	light	moderate
Flatbush	moderate	moderate	Nordegg	light	light
Cold Lake	light	light	Rocky Mtn. House	light	light
Iosegun Lake	light	light	Clearwater	light	moderate
Perryvale	moderate	light	Caroline	light	light
Whitecourt	moderate	severe			
Spedden	moderate	moderate			

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.—More collections of forest tent caterpillars were received in 1958 than in 1957. Patches of light to heavy defoliation occurred in a wide band from Lloydminster to the Peace River Block in the north-central part of the Province and from Blairmore to Medicine Hat in the south. In central Alberta the largest area of heavy defoliation was in the vicinity of Elk Point where larvae were reported in large numbers in 1957. Although the area of heavy infestation was confined to 8 square miles centred at the junction of Highways 41 and 28, light infestations occurred at irregular intervals from Edmonton to the Saskatchewan border. Another narrow band of light infestation extended westward from Lac La Biche for 30 miles along Highway 46.

Small areas of light defoliation were found throughout the southeastern portion of the Peace River Block extending as far north as Keg River on the Mackenzie Highway. At Mile 103 on the Mackenzie Highway, the small infestation which persisted from 1953 to 1956 when there were no other reports of this insect, has not reappeared although the infestation in the Naylor Hills near Keg River is less than 15 miles distant. A 20-acre area 8 miles south of Donnelly and 6 to 8 acres 4 miles east of Crooked Creek were heavily defoliated.

In southern Alberta defoliation occurred to hybrid poplar shelterbelts near Cranford and to shade trees in Lethbridge. Clusters of larvae were noticeable in Medicine Hat in the spring but defoliation was negligible. A light infestation of forest tent caterpillars was present in the Alberta section of the Cypress Hills. Egg clusters and pupal cases were evident in the fall of 1958 along the aspen grove area of the eastern slopes and in the Porcupine Hills. This area extended from the United States Border to Stavely.

Between these two general areas of tent caterpillar activity only two collections were received, one from Winfield and one from Rocky Mountain House.

Sequential sampling and three tree examinations for egg bands were carried out throughout most of the area affected except in the Peace River Block. The results were all negative except in the area of heavy defoliation near Elk Point where once again noticeable defoliation is expected in 1959. Negative results indicated the population level was below that which could be detected by the sampling technique.

Bruce Spanworm, *Operophtera bruceata* (Hulst)—The Bruce spanworm was present throughout the aspen stands in the southern two thirds of the Province. Severe defoliation occurred in the aspen zone of the eastern slopes from the Old Man River north to Sundre, from the junction of the Scab and Ram rivers north to the Brazeau River, and from Highway 16 between Hinton and Edson north to the junction of the Berland and Athabasca rivers.

Smaller patches of heavy infestation were reported from the Hand Hills south of Hanna and in the Camrose district. Light to moderate defoliation, with occasional small heavy patches, occurred throughout the remainder of the area infested. The Bruce spanworm was often associated with several species of leaf rollers and the percentage of damage caused by each species was difficult to assess.

Approximately 30 acres of aspen on the Experimental Range Station west of Stavely were sprayed with DDT in oil; 99 per cent control was obtained. Before spraying, the average number of larvae per tree on three trees $2\frac{1}{2}$ inches D.B.H. and 15 feet high was 887. Parasitism of Bruce spanworm was very low throughout the Province.

Leaf Rollers on Aspen—Leaf rolling larvae were present throughout much of the area in which aspen grows. Three species were present: *Pseudexentera* prob. *oregonana* Wlshm., *Compsolechia niveopulvella* Chamb., and *Choristoneura*

conflictana (Wlk.). *Pseudexentera*, which was first identified from this region in 1958, has never been recorded as an important insect in Alberta. It was the most common leaf roller in 1958, accounting for 75 per cent of the rolled leaves in most areas. Larvae of *Compsolechia niveopulvella* were much less numerous than last year, particularly in the southern portion of the eastern slopes. *Choristoneura conflictana* was responsible for very few rolled leaves. Although larvae of these leaf rollers were numerous, defoliation was light to medium. On some trees at the edges of aspen stands 70 to 90 per cent of the leaves were rolled but the actual amount of foliage destroyed was estimated at less than 40 per cent, since many of the rolled leaves remained green. Very few leaf rollers were reported from the National Parks in 1958. The areas infested by these leaf rollers were the same as those infested by the Bruce spanworm making it difficult to assess the damage.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—The spruce budworm outbreak near Wadlin Lake in north-central Alberta, which was reported declining in 1955, has once again become active. Large areas of defoliated spruce and balsam fir were observed from the air in late August, 1958. Moderate to severe damage was evident in the lower 15 miles of the valley of the Muddy River, a tributary of the Wabiskaw. Light to moderate defoliation was mapped from the junction of the Muddy and Wabiskaw rivers to where the Loon River enters the Wabiskaw.

The infestation in the Cypress Hills reported causing light injury to spruce in 1957 increased in intensity in 1958. This infestation extended eastward into Saskatchewan and westward for 1½ miles up Battle and Grayburn creeks. Severe damage occurred to the current year's growth of spruce. A few larvae were found elsewhere in the Cypress Hills. Small numbers of larvae were also present along the southern end of the eastern slopes of the Rocky Mountains near Coleman and Blairmore. In the Porcupine Hills damage was negligible.

The large spruce budworm outbreak along the Mackenzie River was not examined in 1958. The infestation on the Slave River north of Fort Smith was reported by Mr. W. Jefferys of the Department of Northern Affairs and National Resources, to extend from Le Grand Detour approximately 40 miles north of Fort Smith to within 35 miles of the mouth of the Slave River. Damage was moderate to heavy.

The 2-year-cycle spruce budworm in the National Parks was very scarce in 1958 and defoliation was not noticeable. One third of the larvae collected in the spring were dead. There was no evidence of disease in the larvae examined.

Yellow-headed Spruce Sawfly, *Pikonema alaskensis* (Roh.)—This pest of shelterbelts was common throughout the agricultural area north of Calgary. The largest area of severe defoliation was centred at Edmonton and bounded by a line through Camrose, Beaverhill Lake, Gibbons, Barrhead and Drayton Valley. Within this area, along a strip from Drayton Valley to Spruce Grove, the number of heavily infested shelterbelts was greatly reduced from 1957; chemical sprays and parasitism were responsible for this reduction. Shelterbelts between Airdrie and Ponoka, in the Stettler district, and near Valleyview were severely defoliated. The use of chemical sprays caused a sharp reduction in the number of severely defoliated shelterbelts in the Hanna–Drumheller district. A small infestation on Engelmann spruce south of the Gap Ranger Station in the Livingstone Forest Reserve remained active. In 1958 twigs and needles were very short. Past defoliation plus 50 per cent defoliation of the current year's growth left the trees with very little foliage.

Root Weevils, *Hylobius warreni* Wood and *Hylobius pinicola* (Couper)—Infestations of *H. warreni* remained much the same as those reported in previous

years. Two adults of *H. pinicola* were taken from tamarack at Grassland. This is the first record of this species taken in Alberta since it was distinguished from *H. warreni* in 1957.

Spruce Spider Mite, *Oligonychus ununguis* (Jac.)—There was an increase in the number of severely infested shelterbelts in the Calgary–Stettler area in 1958. Severe damage was also reported from Widewater townsite. A small patch of mature native spruce trees was severely damaged at McLennan. Elsewhere damage was light, although infestations were widespread. Light infestations were again present in Banff and Jasper townsites.

Pine Needle Scale, *Phenacaspis pinifoliae* (Fitch)—The infestation of pine needle scale along the York Creek Road south of Coleman was 1 mile long by $1\frac{1}{2}$ miles wide. Near the centre of this area trees were severely infested and lost about 50 per cent of their foliage. Examination late in the fall revealed that new scales were less numerous than they had been in the fall of 1957. The coccinellid predator, *Chilocorus stigma* (Say), was again present. Pine needle scale was found on lodgepole pine throughout much of southwestern Alberta and in the Cypress Hills. A light infestation was observed south of the Waterton townsite along the trail to Bertha Lake. The small light infestation reported $\frac{3}{4}$ mile south of Elkwater townsite remained the same as in 1957.

Leaf Eating Beetles, *Phytodecta americana* (Schaeff.) *Galerucella decora* (Say), *Dichelonyx backi* Kby. *Chrysomela* sp. and *Altica* spp.—There were no large areas of defoliation by leaf eating beetles in 1958. The American aspen beetle, *P. americana*, was present throughout the forested area of the Province and caused light to moderate defoliation of small areas in widely separated locations. Larvae of the grey willow-leaf beetle, *G. decora*, caused defoliation of willow in localized patches in the Fahler–Girouxville area and at Berwyn, Fairview and Eureka River. The green rose chafer, *D. backi*, caused defoliation to rose and saskatoon at Entrance, Erith, Beaver Lodge, and along the eastern slopes south of the Highwood River. Larvae of *Chrysomela* sp. caused light defoliation to willow in a shelterbelt at Cranford and on regeneration balsam poplar and willow east of Banff. *Altica* sp. defoliated alder at Louise Falls on the Hay River in the N.W.T., and at the junction of the Baptiste and North Saskatchewan rivers in central Alberta. On the east shore of Lesser Slave Lake a species of *Altica* severely defoliated young balsam poplar and willow.

Fall Cankerworm, *Alsophila pometaria* (Harr.)—Light to moderate infestations were reported from an area bounded by Medicine Hat, Claresholm, Magrath and Foremost. Severe defoliation of farm shelterbelts took place near Cranford, Barnwell, Winifred, Whitla, Foremost, and Magrath. There was no noticeable change in the number of shelterbelts affected.

Cecropia Moth, *Hyalophora cecropia* (L.)—This insect has been absent from the shelterbelts of Alberta since the last outbreak which reached a peak in 1948 and subsided to a low level in 1950. Some collections were received in 1957 and 1958. Lightly infested shelterbelts were found near Taber, Foremost, Medicine Hat, Grassy Lake, Whitla and Wrentham.

Black-headed Budworm, *Acleris variana* (Fern.)—Light infestations were reported from Banff and Waterton Lakes national parks, and moderate damage occurred on alpine fir at Marble Canyon in Kootenay National Park. Larvae were more plentiful in the Clearwater Forest Reserve than in 1957. Light damage was reported near the Strachan Ranger Station and west of Ricinus. Elsewhere in the region damage was negligible.

Spiny Elm Caterpillar, *Nymphalis antiopa* L.—The number of colonies of this insect remained much the same as in 1957 although some reduction in numbers was reported from the southwestern part of the Province. A heavy infestation occurred on young American elms at the School of Agriculture, Fairview.

Tent Caterpillars, *Malacosoma pluviale* (Dyar) and *Malacosoma lutescens* (N. & D.)—There was little change in the numbers of these tent caterpillars from 1957. Tents were frequently observed in the southern half of the Province and in the Peace River Region.

Ugly-nest Caterpillar, *Archips cerasivoranus* (Fitch)—Chokecherry and other shrubs were heavily infested from Peace River to Berwyn and in a 2-acre patch near Paddle Prairie on the Mackenzie Highway. Nests were also common in the southern half of the eastern slopes of the Rocky Mountains.

Aspen Leaf Miner, *Phyllocnistis populiella* Cham.—This leaf miner was present throughout the National Parks. The heaviest infestation occurred in the Yellowhead Pass, Jasper National Park. In an area extending 3 miles along the valley 90 per cent of the leaves were mined. West of Field, in the Yoho National Park, 30 per cent of the leaves were mined; elsewhere the mining was much less common.

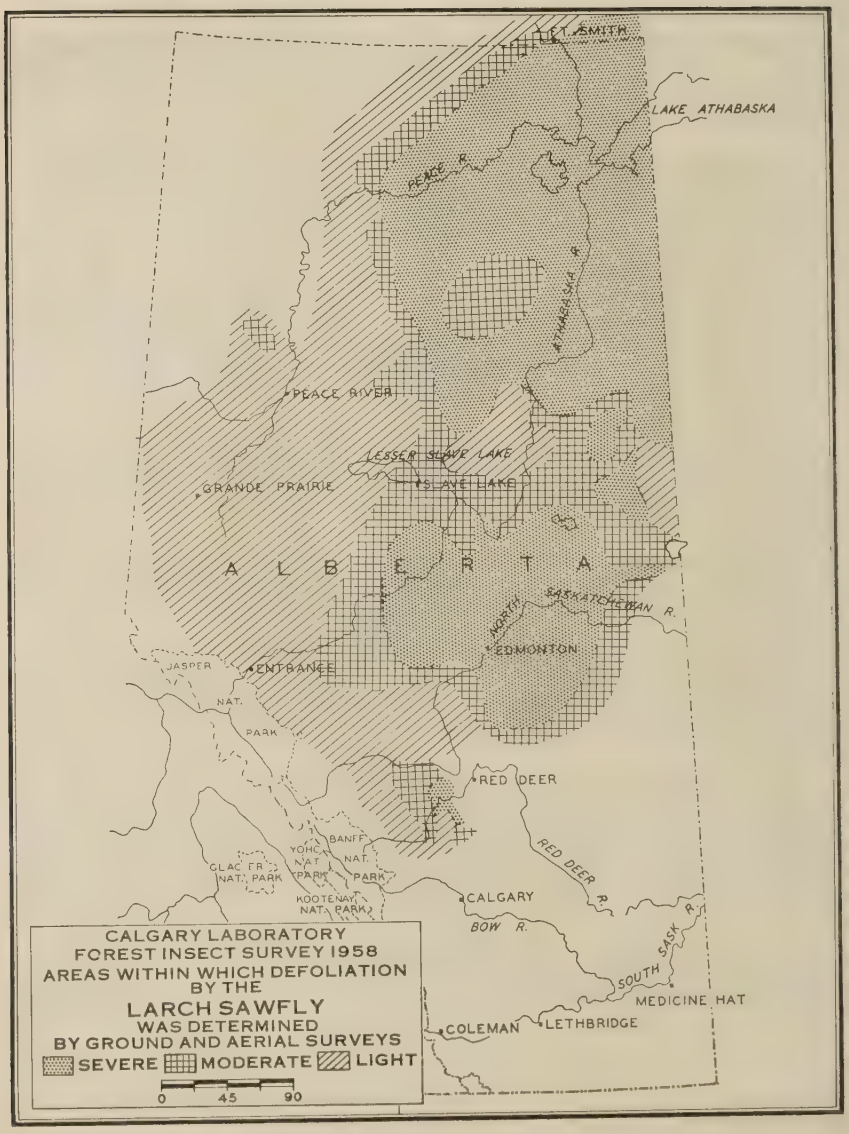
Lodgepole Needle Miner, *Recurvaria starki* Free.—The numbers of the lodgepole needle miner in the National Parks has remained low for the past 5 years. In 1958 there was a slight reduction at the 5,400 ft. level on Mount Eisenhower and a slight increase at lower levels. A few mined needles were found in the Cypress Hills.

Conifer Sawflies, *Neodiprion* sp.—There was little change in the damage caused to spruce by *Neodiprion* sawflies from that reported in 1957. Moderate to light damage occurred in the Lacombe–Ponoka region.

A Needle Miner, *Recurvaria canusella* Free.—Needle miners were frequently found on black spruce in central Alberta. Near Gunn and south of Chip Lake mined needles were numerous. A few mined needles were found on jack pine at Duffield, Whitecourt, and Fort Smith, N.W.T., and on lodgepole pine near Bickerdike.

Striped Alder Sawfly, *Hemichroa crocea* (Fourc.)—Several reports of heavy defoliation of alder by this sawfly were received in 1958. East of Breton the alders over 90 acres were completely defoliated. Severe defoliation also occurred along the shore of Winifred Lake and on the river bank west of Peace River. A $\frac{1}{2}$-acre patch near Triangle and individual bushes near Three Creeks were also severely defoliated.

Caragana Aphid, *Acyrthosiphum caraganae* (Cholod.)—Heavy infestations of the caragana aphid occurred in the Fairview–Berwyn area and near Three Creeks in the Peace River Block.


FT. SMITH
LAKE ATHABASKA
PEACE R.
ATHABASKA R.
PEACE RIVER
LESSER SLAVE LAKE
GRANDE PRAIRIE
SLAVE LAKE
ALBERTA
NORTH SASKATCHEWAN R.
EDMONTON
JASPER NAT. PARK
ENTRANCE
RED DEER
RED DEER R.
BANFF NAT. PARK
YOHO NAT. PARK
GLACIER NAT. PARK
KOOTENAY NAT. PARK
CALGARY
BOW R.
SOUTH SASK R.
MEDICINE HAT
COLEMAN
LETHBRIDGE
CALGARY LABORATORY
FOREST INSECT SURVEY 1958
AREAS WITHIN WHICH DEFOLIATION BY THE
LARCH SAWFLY
WAS DETERMINED
BY GROUND AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
0
45
90

PROVINCE OF ALBERTA

FOREST DISEASE SURVEY

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INTRODUCTION

The relatively few disease outbreaks reported during the year permitted the concentration of Disease Survey activities on the re-examination of previously reported outbreaks. New reports received included two areas of winter injury to lodgepole pine and one each of white-pine blister rust and flagging of lodgepole pine. A total of 907 collections were processed during the year, 865 being cultural isolates of which 19 remain unidentified. The cultures processed by the Laboratory were largely the result of a cull survey program for aspen and balsam poplar being carried out jointly by the Laboratory and the Alberta Department of Lands and Forests.

The staff of the Mycology Unit, Botany and Plant Pathology Division, Ottawa, contributed substantially to the success of the Survey by identifying a number of the collections. Thanks are due also to the Alberta Department of Lands and Forests and to private forest agencies for their reporting of disease conditions during the year.

IMPORTANT DISEASES

Atropellis Canker of Pine—This disease, caused by *Atropellis piniphila* (Weir) Lohm. and Cash, is widespread on lodgepole pine in the foothills of Alberta. No new areas having a high incidence of the disease were noted during 1958. The known distribution and the relative intensity of the disease in particular areas of Alberta is illustrated in the accompanying map. It is perhaps worthy of note that the disease is unreported on jack pine or on jack pine–lodgepole pine hybrids.

Winter Injury of Pine—Reddening of the foliage of lodgepole pine was reported for an area of about 80 acres west of Mercoal and in the vicinity of the Simonette River, 70 miles northwest of Entrance. The topography of these areas and their proximity to the Rocky Mountains, together with symptoms typical of winter injury, indicated the tentative diagnosis of "red belt". Both areas will be re-examined in 1959.

A re-examination was made of stands in the Kananaskis Valley that were known to have sustained "red belt" damage in 1956 and 1957. A slight decrease in diameter growth was indicated on the basis of increment core examinations, presumably due to the loss of 1956 and 1957 foliage, but no permanent damage was noted. Accordingly, the growth rate of these stands is expected to recover as the trees regain their normal amount of foliage.

Needle Cast of Lodgepole Pine—The needle cast disease of lodgepole pine (*Hypodermella montivaga* (Petrak) Dearn.) reported in outbreak proportions in Banff and Jasper National Parks in 1955-57 was not reported from these areas in 1958. A small outbreak of the same disease reported in 1957 for the Dutch Creek area of the Crowsnest Forest showed a reduced amount of damage on re-examination in 1958.

Needle Rust of Spruce—Outbreaks of the spruce needle rust (*Chrysomyxa ledicola* Lagerh.) that were reported as severe in the Lac La Biche–Philomena and Smith areas in 1954-56 were less severe in 1957 and had subsided on re-examination in 1958.

Blister Rust of Limber Pine—White-pine blister rust (*Cronartium ribicola* J. C. Fischer) was observed on limber pine (*Pinus flexilis* James) in Waterton Lakes National Park for the first time in 1958. Twig, branch, and stem cankers were noted on about 75 per cent of the pines in a mixed forest of Engelmann spruce–alpine fir–limber pine. The affected area totalled about 1700 acres.

Unexplained Clumping of Aspen Foliage—This disease, first reported in 1953 in the Rocky Mountain National Parks, and subsequently observed in 1954 throughout the natural range of aspen in Alberta and again in 1957 in areas southwest of Red Deer and Calgary, went unnoticed in 1958. Previously affected trees showed apparent recovery, thus strengthening the assumption that the casual agent is climatic rather than infectious.

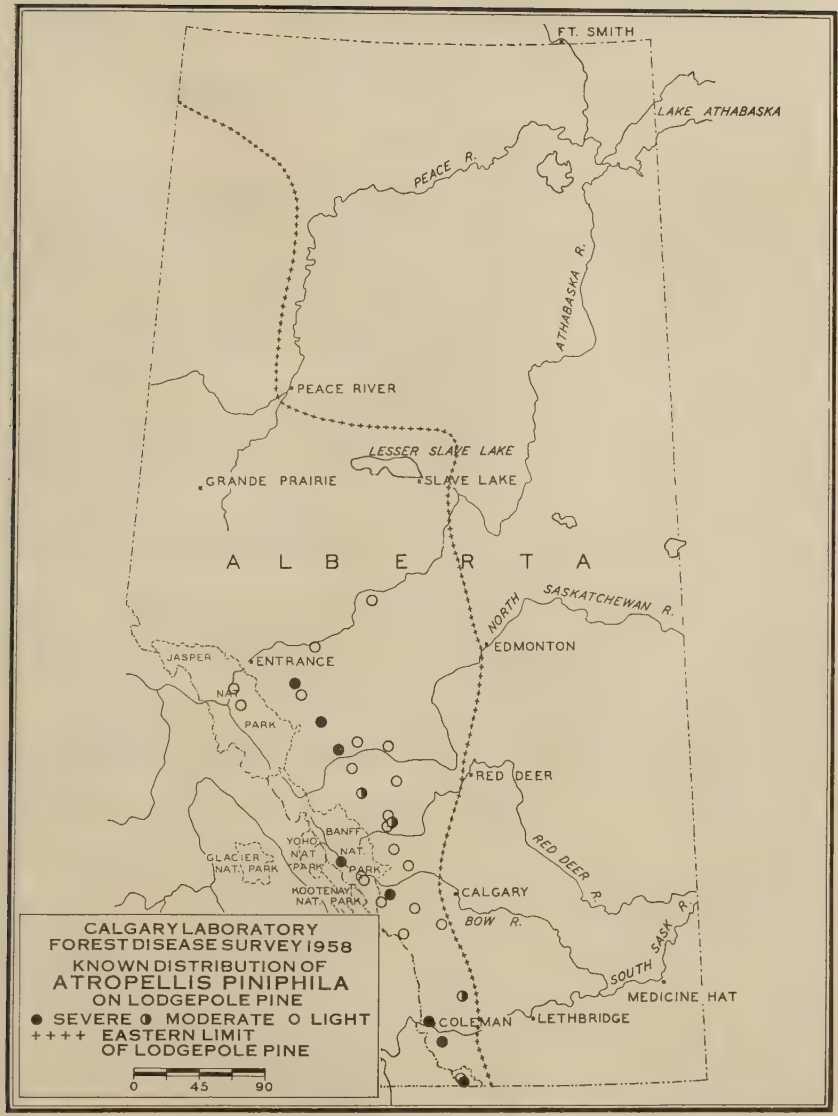
Decay in Aspen and Balsam Poplar—The survey of decay in living aspens and balsam poplars, begun in 1957 in co-operation with the Alberta Department of Lands and Forests, was continued in 1958 in the Whitecourt and Grand Prairie areas. A total of 1139 trees have been examined from which a total of 1690 isolates were made from decayed wood. The relative importance of the fungi associated with the decays, on the basis of the frequency of their isolation from decayed wood, is as follows:

On Aspen	On Balsam Poplar
Fomes igniarius var. *populinus* (Neuman) Campbell	*Libertella* sp.
Corticium polygonium Pers.	*Fomes igniarius* var. *populinus* (Neuman) Campbell
Radulum casearium (Morgan) Lloyd	*Pholiota spectabilis* (Fr.) (Quél.)
Libertella sp.	*Stereum purpureum* (Pers.) Fr.
Pholiota spectabilis (Fr.) Quél.	*Pholiota destruens* (Brond.) Quél.
Phlebia strigoso-zonata (Schw.) Lloyd	
Polyporus zonatus Fr.	
Armillaria mellea (Vahl ex Fr.) Quél.	
Stereum purpureum (Pers.) Fr.	
Polyporus adustus Willd. ex Fr.	

Flagging of Lodgepole Pine—A high incidence of flagging in young stands of open-grown lodgepole pine was observed at several points along the Coleman–Kananaskis Trunk Road in 1958. Examination of the flagging condition revealed a close association with what appeared to be squirrel damage to cone-bearing branches.

OTHER NOTEWORTHY DISEASES

Host	Organism	Locality	Remarks
Currant, cultivated	*Septoria ribis* Desm.	Lacombe	Associated with leafspot. New herbarium record.
Elder, cultivated	*Septoria sambucina* Pk.	Lacombe	Associated with leafspot. New herbarium record.
Pine, lodgepole	*Zythia resinae* (Ehrenb.) Karst.	Mile 100 Banff-Jasper Highway	On old Cronartium cankers. New herbarium record; previously isolated in culture.
Pine, lodgepole	*Tympanis confusa* Nyl.	Mercoal	Associated with trunk lesions. New herbarium record.
Spruce, white.	*Lophodermium filiforme* Darker	Kananaskis	Needle cast of spruce, herbarium record.


FT. SMITH
LAKE ATHABASKA
PEACE R.
ATHABASKA R.
PEACE RIVER
LESSER SLAVE LAKE
GRANDE PRAIRIE
SLAVE LAKE
A L B E R T A
NORTH SASKATCHEWAN R.
EDMONTON
JASPER
NAT.
PARK
ENTRANCE
RED DEER
BANFF
YOHO
NAT.
PARK
GLACIER
NAT. PARK
KOOTENAY
NAT. PARK
CALGARY
RED DEER R.
BOW R.
SOUTH SASK R.
MEDICINE HAT
COLEMAN
LETHBRIDGE
CALGARY LABORATORY
FOREST DISEASE SURVEY 1958
KNOWN DISTRIBUTION OF
ATROPELLIS PINIPHILA
ON LODGEPOLE PINE
● SEVERE ◑ MODERATE ○ LIGHT
++++ EASTERN LIMIT
OF LODGEPOLE PINE
0 45 90

PROVINCE OF BRITISH COLUMBIA

FOREST INSECT SURVEY

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INTRODUCTION

A number of forest insects attracted attention during the 1958 field season. The 1-year-cycle spruce budworm outbreak in the Lillooet and Fraser River valleys appeared to be maintaining itself as there was no significant decrease in the number of eggs laid in 1958. The 2-year-cycle spruce budworm infestation in the Babine Lake area enlarged and the number of egg masses increased. Activity of the Douglas-fir beetle increased in the Interior but the Engelmann spruce beetle appeared to be decreasing. The black-headed budworm showed a small increase in abundance on the Queen Charlotte Islands, but the outbreak on northern Vancouver Island has subsided.

One of the outstanding features of the year was the discovery of the balsam woolly aphid in amabilis fir stands in the Vancouver mainland district. Identification of the aphid was verified by Dr. R. E. Balch of the Fredericton Laboratory. Also of interest were significant increases in several species of geometrids, particularly the western hemlock looper and the green-striped forest looper.

Forest closures in the coastal regions affected several ranger districts for prolonged periods during July and August. This precaution seriously hampered insect and disease surveys in many areas.

The Victoria Laboratory received 2,235 insect collections and the Vernon sub-laboratory 2,902 for a total of 5,137. The collections submitted by the British Columbia Forest Service and by other co-operators are acknowledged with thanks. The use of aircraft provided by the British Columbia Forest Service and forest industries for special surveys and reconnaissance work was appreciated and of great assistance.

Collections received during 1958 were distributed among the principal tree species as follows:

Coniferous trees	Collections		Broad-leaved trees	Collections	
Douglas fir		906	Poplar		
			Trembling aspen	253	
Hemlock—			Black cottonwood	112	
Western hemlock	813		Silver poplar	10	
Mountain hemlock	8		Balsam poplar	4	
Eastern hemlock	1		Lombardy poplar	4	
			Miscellaneous poplars	9	
		822			392
Spruce			Alder		
White spruce	404		Red alder	76	
Englemann spruce	148		Mountain alder	65	
Sitka spruce	84		Sitka alder	35	
Black spruce	40		Green alder	9	
Miscellaneous spruces	10		Miscellaneous alders	16	
		686			201

Coniferous trees	Collections		Broad-leaved trees	Collections	
Pine			Birch		
Lodgepole pine	395		White birch	59	
Ponderosa pine	156		Dwarf birch	28	
Western white pine	53		Western white birch	10	
Scots pine	3		Water birch	9	
White bark pine	3		Miscellaneous birches	38	
Miscellaneous pines	3				
		613			144
			Willow	266	
			Cherry	49	
			Garry oak	37	
			Maple	15	
			Hawthorn	13	
Fir			Dogwood	11	
Alpine fir	201		Apple	10	
Grand fir	58		Miscellaneous broad-leaved trees	16	
Amabilis fir	48				
Balsam fir	1				
		308	Total		1,154
Larch					
Western larch	70				
Tamarack	35				
European larch	1				
		106			
Juniper					
Rocky mountain juniper	33				
Common juniper	20				
		53			
Western red cedar		103			
Miscellaneous coniferous trees		2			
Total		3,599			

Miscellaneous hosts or no hosts specified 384

Grand Total 5,137

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—The total area of the spruce budworm infestation in the Lillooet River and Lake and the Fraser River regions was 653 square miles, an increase since 1957 of 155 square miles. This increase was caused by extensions up valleys and hillsides, particularly from Tisdall to Alta Lake, and by a 48 square mile area around Boston Bar which was not mapped last year. Of the total area 92 square miles were classified as heavy defoliation, 41 square miles as medium, and 520 square miles as light.

Heavy defoliation in 1958 occurred in several localized areas scattered throughout the infestation. The heaviest feeding occurred from Tenas Lake to Gowan Creek, around Blackwater Lake, and in spots along Anderson and Seton lakes, and Fraser River below Lillooet, and in the upper Anderson River Valley. At the Skookumchuck (between Tenas Lake and Gowan Creek) many trees lost all of their 1958 foliage, much of last year's needles, and up to 15 feet of the tops were completely stripped. Over 75 per cent of the current year's growth was lost in areas along the Blackwater Creek road, Seton Lake, and in the Anderson River Valley.

In many areas the foliage was not more than 3 years old due to previous defoliation. In some cases the 1958 needles comprised 50 per cent of the total foliage now on the trees. Therefore, in these areas, the loss of all current growth was particularly serious. However, the percentage of buds killed was low in all areas, and the trees should produce some new growth in 1959.

The average number of egg masses per 100 square feet of foliage surface decreased from 31 to 26 in the plots along the Lillooet River and Lake. A general decrease was also recorded at random sampling points along Anderson and Seton lakes and the Fraser River. However, the decrease in the number of egg masses was not significant. This was the first year since 1955 that the number of egg masses has not decreased by approximately 50 per cent.

Egg parasitism was low; only 0.7 per cent of the egg masses in the Lillooet River and Lake area contained one or more parasites compared with about 9 per cent in 1957. Larval and pupal parasitism remained about the same at 39.5 and 32.4 per cent respectively. In the Anderson Lake–Fraser River area no egg parasites were found compared with 4 per cent of the egg masses parasitized in 1957. Larval parasitism was 31 per cent.

As the decrease in the egg counts was not significant, the infestation in general cannot be considered as decreasing in intensity. The outlook for 1959 is for continued generally light defoliation with medium to heavy defoliation in localized areas.

The 1-year-cycle budworm was slightly more abundant on Douglas fir in the Interior, but, with the exception of the Lillooet area, did not reach outbreak proportions. The Smith River infestation recurred on white spruce trees between mile 510 and 516 of the Alaska Highway near the Yukon border but apparently has declined in intensity.

The area of the 2-year-cycle spruce budworm infestation in the Prince Rupert Forest District was calculated at 1,286 square miles in 1958, an increase of 294 square miles compared with 1956. Defoliation of white spruce and alpine fir was heavy in most areas; in 10 permanent plots the loss of current foliage ranged from 75 to 100 per cent and averaged 95 per cent; the total loss of foliage older than one year averaged 43 per cent. Top kill ranging from 4 to 54 per cent of the trees was recorded in 6 plots with the heaviest top kill at Sunnyside and opposite Fort Babine on Babine Lake. Dead tops ranged from 1 to 9 feet in length.

Egg counts were made throughout the infestation area on white spruce, alpine fir, and lodgepole pine trees. The average number of egg masses per 18-inch branch sample was: alpine fir, 4.4; white spruce, 4.6; lodgepole pine, 6.1. The samples from alpine fir and white spruce were taken from the lower crown, and those from lodgepole pine from the upper crown. Ten plots set out in 1956 were resampled this year. The average number of egg masses increased from 2.2 in 1956 to 3.7 in 1958.

Parasitism was almost non-existent. No larval parasites were obtained from insectary rearings. Ten out of 93 pupae in a collection from west of Babine Lake were parasitized. No other parasites were recorded.

The egg mass counts indicate a general increase in spruce budworm population levels in the Babine Lake area in 1959.

The 2-year-cycle budworm also caused light to medium defoliation in a few areas in the Prince George Forest District; elsewhere in the Interior numbers were low. The most severe infestation in the Prince George District was along the western slopes from Tabor Mountain to the Naver Creek watershed. Up to 70 per cent of the new foliage of alpine fir and white spruce trees along the southwestern side of Takla Lake was destroyed. Other extensive areas of light infestation were observed at Takla Narrows, Dominion Point, and north of Timber Bay. Collections: Coast 138, Interior 125.

Black-headed Budworm, *Acleris variana* (Fern.)—The black-headed budworm infestation on northern Vancouver Island collapsed in 1957 and remained at a very low level in 1958. Egg counts were made in 34 localities,

32 of which were established in 1955. The British Columbia Loggers' Association assisted by providing 10 hours flying time. The average egg count per 10-inch branch tip based on five tips from the upper crown of three trees from each sample point was only 0.024, a drop of 85 per cent compared with 1957. The number of sample points at which eggs were found also decreased from 17 to 9. The three main areas where eggs were found were at Holberg, between Port Hardy and Port McNeil, and in the Nimpkish River Valley. No defoliation is expected in 1959.

The trees in the infestation area are still thin as a result of severe feeding from 1955 to 1957, but in general the stands are recovering well. Top killing in reproduction stands is prevalent at Beaver Cove; 90 out of 200 trees examined had died back from 1 to 10 feet.

Black-headed budworm larvae were found in small numbers on southern Vancouver Island, in the Bella Coola area, and on the southern mainland. The largest collection was from Hope where 40 larvae were collected in one 3-tree beating sample.

The population level increased appreciably on the Queen Charlotte Islands in 1958. Larvae and pupae were collected on the northern end of Graham Island at Naden Harbour, Masset Sound and in Masset Inlet, but the largest collections were taken on Moresby Island. Thirty-seven larvae and pupae were collected in one 3-tree beating sample at Jedway, 33 south of Bigsby Inlet, and 17 at Lockeport. While these numbers are not large they represent a considerable increase over 1957.

At Stewart, stands which had been heavily attacked by the black-headed budworm from 1950-54, were re-examined. At Bear Lake, where defoliation had been severe, 76 per cent of the intermediate crown class trees had dead tops ranging up to 10 feet. It was estimated that about 20 per cent of the intermediate trees in the Stewart area had dead tops.

Black-headed budworm larvae were collected in small numbers from many points in the Interior of British Columbia and in the Yukon. The largest collections were from the Kamloops Forest District.

Larvae were numerous on hemlock at Keen Creek, Nelson Forest District, but became scarce by mid July. A localized light infestation was observed in an alpine fir stand along Cabin Creek. Collections: Coast 82, Interior 169.

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk.—Red-topped trees killed by the Douglas-fir beetle in some regions of the Kamloops Forest District and in the Quesnel area of the Prince George Forest District were more evident in 1958 than for several years. The incidence of attack was greatest near sawmills and logging operations.

There was a reduction of Douglas-fir beetle damage in the "winter damage" (1952-53) area about Helena and Place lakes. In 1958 infestations of several year's duration were discovered in the Nelson Forest District at Whiteswan Lake and Wigwam River. Small outbreaks occurred on the north end of Perry Ridge southwest of Slocan and 6 miles north of Nakusp on Upper Arrow Lake. There was also a general increase in these areas particularly in Douglas fir stands suffering from various diseases.

In the coastal region Douglas-fir beetle activity was much reduced. A few fresh attacks were noted on Vancouver Island between Boswer and Qualicum, and in the Van West Logging operations near Comox.

Mountain Pine Beetle, *Dendroctonus monticolae* Hopk.—A general increase in the number of infested white pine trees occurred from Arrow Park northward along Upper Arrow Lake and in the Slocan Valley. A previously

unreported infestation on Halfway Creek included 350 red-topped pines. A small infestation was noted on Hoder Creek. Farther north some 175 mature and overmature red-topped white pine were observed between Revelstoke and Frisby Creek. The most northerly current infestation in white pine is near Blue River where 75 trees are infested. There was an increase in white pine mortality at Noisy Creek, near Mabel Lake.

A small increase in the infestation in lodgepole pine was noted in areas of "winter damage" (1952-53) near Joe's, Helena, and Place lakes. Lodgepole pine trees recently killed by bark beetles were observed for 2½ miles at elevations between 3,000 and 4,800 feet along Windfall Creek north of Greenwood. The infestations in lodgepole pine on the western side of the Upper Columbia Valley along Frances Creek and about Whitetail Lake decreased.

The mountain pine beetle outbreak in lodgepole pine along the east shore of Babine Lake in the Prince Rupert Forest District has decreased in intensity. Red tops were noticeable in some areas, but less numerous than in previous years. Aerial surveys were used to map the three main areas of heavy infestation, which totalled over 23 square miles. Strips were run and all red tops and trees which had died since 1955 were tallied. Total tree mortality was calculated at approximately 28 million cubic feet.

Engelmann Spruce Beetle, *Dendroctonus engelmanni* Hopk.—In the Nelson Forest District attacks by the Engelmann spruce beetle continued, although at a declining rate. The population level is relatively high in the upper valley of Bighorn Creek; surveys revealed that 54 per cent of mature spruce stems in the upper valley have been beetle-killed. Active infestations persisted at Watson, Russel and Grave creeks.

A reconnaissance at Grave Creek revealed that almost the entire 1958 attack occurred within 350 feet of logging slash, a condition which often results after logging is discontinued. Spruce beetle attacks in the Cabin, Storm and Sage creek valleys have subsided. Scattered small areas of Engelmann spruce in the Little Slocan River watershed have active beetle infestations but tree mortality has been light. A survey on horseback through Beaver River Valley in Glacier Park indicated little current destruction by this beetle, although some spruce trees have died in recent years.

Spruce Beetle, *Dendroctonus* sp.—A localized beetle outbreak resulted in the killing of 21,000 cubic feet of white spruce timber on 33 acres 4 miles southwest of Smithers in the Prince Rupert Forest District. Adults collected were tentatively identified as *Dendroctonus obesus* Mann.

Pine Bark Beetles, *Dendroctonus* spp.—The western pine beetle, *Dendroctonus brevicomis* Lec. in association with the red turpentine beetle. *D. valens* Lec. killed 14 ponderosa pine trees at Monte Lake and 6 at Alleyne Lake, Kamloops Forest District. Three other larger groups of infested trees with the same beetle association were observed between Squilax and Chase.

Western Balsam Bark Beetle, *Dryocoetes confusus* Sw.—This bark beetle recurred in alpine fir trees about the perimeter of about 30 square miles of dead and dying fir timber at McGillivray Lake. Additional tracts of similarly affected alpine firs were seen from the air in six places between Louis Creek and Barriere River. These latter areas covered 18 square miles. Other patches of infested trees were observed on the west side of the North Thompson River, and three patches at Burton Creek, Ledge Creek, and Pingston Ridge totalled 5 square miles. *Dryocoetes confusus* and other bark beetles were associated with *Leptographium* (see Forest Disease Survey Report) in the infestations examined on foot.

Alpine fir trees infested with or killed by *Dryocoetes confusus* were observed over 330 acres at Bolean Lake. Of these dead or dying trees, 24 per cent were attacked by *Dryocoetes* in 1958.

Oregon Pine Engraver, *Ips oregoni* (Eich.)—Young ponderosa pines in the Kettle River Valley were infested by engraver beetles. The heaviest attack occurred 2 miles south of Westbridge, where a group of approximately 90 trees ranging from 2 to 12 inches D.B.H. were killed. Smaller groups were observed nearby, and near Grand Forks. Some red turpentine beetles, *Dendroctonus valens* Lec. and engraver beetles, *Ips integer* (Eich.), were present but the primary attack was made by the Oregon pine engraver which, in most instances, had originated in untreated slash.

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)—The presence of the balsam woolly aphid in British Columbia was positively verified in 1958. It is now known to occur in North and West Vancouver, on the east side of Howe Sound, and New Westminster. Infested trees were found up to the 3,500-foot level on Mt. Seymour. Amabilis fir was the primary host, but grand firs were occasionaly attacked. The infested trees were mainly in predominantly hemlock stands, and approximately 80 per cent of the trees are attacked. Tree mortality has already occurred and should continue in view of the heavy stem and gout attacks now present. Indications are that the balsam woolly aphid has been present in these areas for at least 8 years.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hulst)—This potentially dangerous looper increased in numbers in the southern coastal region during 1958. Small numbers of larvae were collected at all places sampled in Rivers Inlet and the Bella Coola Valley. One to three larvae per 3-tree beating sample were collected consistently in the Sarita, Nitinat, and Caycuse River areas on southern Vancouver Island, and throughout northern Vancouver Island. In the latter area the largest numbers, up to 12 larvae per collection, were at Holberg Inlet. The largest increase was on the southern mainland in Stanley Park where up to 61 larvae were collected in a single sample. Although the population level was generally low, the number of larvae collected represents a considerable increase compared with 1957, and the range included most of the coastal western hemlock stands south of Bella Coola.

Larvae were more numerous in 1958 than in 1957 in the Interior, but no obvious defoliation was observed. The largest collections were from Keen Creek where up to 20 larvae were beaten from a single hemlock tree. Collections: Coast 131, Interior 78.

Phantom Hemlock Looper, *Nepytia phantasmaria* (Stkr.)—Only a few larvae were collected at Queen's Park, New Westminster, and Central Park, Burnaby. Both parks were sprayed with DDT in 1957 to control this insect. As a result of heavy defoliation in 1956, 364 trees totalling 153,059 board feet were killed in Queen's Park. Sixty per cent of the volume was estimated to be western hemlock and 40 per cent Douglas fir. Mortality was much lighter in Central Park; only 18 trees totalling 10,780 board feet were killed, but a few more trees may die. Of the trees on which defoliation estimates were made only those which were 70 per cent or more defoliated have died.

An expected outbreak in the municipal park at Hope did not develop. Parasites were partly responsible for the decrease; of 621 eggs collected and reared in the late winter of 1958, 55.7 per cent were parasitized. Up to 32 larvae per collection were found in stands near Hope, but there was no noticeable defoliation. Small numbers of this looper were collected in Stanley Park, Vancouver. Collections: Coast 36.

Green-striped Forest Looper, *Melanolophia imitata* Wlk.—This looper increased in numbers in 1958. Hosts were western hemlock, Douglas fir, and balsam. Although recorded from all coastal ranger districts most of the collections were from the Vancouver Forest District. Larvae were collected in most watersheds on Vancouver Island in numbers up to 51 per 3-tree beating sample. The largest numbers were found in the South Vancouver District at Stave Falls and in Stanley Park. In the latter area, up to 450 larvae per sample were collected, and this species, in conjunction with the western hemlock looper and other insects, caused noticeable defoliation to the overstory trees. Understory hemlock and Douglas fir trees were up to 70 per cent defoliated. Although it was impossible to sample the overstory trees the heavy frass drop indicated the presence of large numbers of larvae. About 600 acres of Stanley Park were sprayed with 10 per cent DDT by Skyway Air Services Ltd. on July 26. Beating samples taken 2 days after spraying showed a decrease in numbers, but in many places a heavy midstory of vine maple prevented the understory trees from receiving a dosage heavy enough to kill all the larvae. However, further defoliation of the valuable overstory trees was prevented. Larval parasitism was very light, averaging less than 2 per cent. Collections: Coast 354, Interior 97.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.—In 1958 the average defoliation was about 50 per cent in a 700-acre aspen stand at the north end of Adams Lake. Egg counts indicate that this infestation has declined further, although sufficient eggs are present to forecast moderate defoliation in 1959.

The light to moderate infestation in the McBride area enlarged to a total of 50,000 acres. Egg counts indicate that the infestation may increase in severity and expand in area during 1959.

Alder, cottonwood, and willow in the South Vancouver District were defoliated from Ladner to Murrayville south of the Trans Canada Highway to the International Border. Small groups of trees within this area were completely stripped. Light to heavy defoliation of cottonwood, alder, and willow also occurred between 18 and 22 miles north of Pemberton in the upper Lillooet River Valley. Collections: Coast 11, Interior 15.

Western Tent Caterpillar, *Malacosoma pluviale* (Dyar)—The infestation on the Saanich Peninsula declined again in 1958. Feeding was inconspicuous. A small infestation around Youbou near Cowichan Lake remained active but decreased in intensity. This species was also found in association with the forest tent caterpillar north of Pemberton.

The western tent caterpillar infestation in the Skeena River Valley continued in 1958. A total of 527 tents were counted on one side of a 1-mile stretch of the Remo Road near Terrace. Another count also near Terrace yielded 1,209 tents. Hosts were birch, trembling aspen, and black cottonwood with birch suffering the heaviest defoliation.

In the Interior tents were abundant on antelope bush near Fort Steele and Elko in the Nelson Forest District; elsewhere tents were less common.

The form on dwarf birch and willow in the Prince George District was not collected in 1958. Collections: Coast 44, Interior 6.

Douglas-fir Needle Miner, *Contarinia* spp.—There was a continued decrease of Douglas-fir needle miners in much of the Interior. At present they are at a light infestation level.

These needle miners were found in nearly all Douglas fir stands in the Vancouver Forest District. Attacks ranged from light to heavy. Collections: Coast 73, Interior 130.

Conifer Sawflies, *Neodiprion* spp.—Some species of *Neodiprion* were again numerous in parts of the Kamloops and Nelson forest districts. A light infestation was present on ponderosa pine at Walhachin. Medium to severe defoliation of lodgepole pine recurred in 1958 at the Little Shuswap Indian Reserve. Another species lightly defoliated Douglas fir terminals in the same Reserve. Douglas fir trees about Postill Lake and Long Mountain in the Kamloops District and at Kuskanook, Nelson Forest District, were discolored by *Neodiprion* feeding. *Neodiprion* sawflies increased in several mature and overmature hemlock stands in the Interior, notably in the Nelson Forest District. In an overmature stand along Leadville Creek, northeast of Kitchener, medium defoliation extended for 1½ miles. The lower crowns of hemlock trees along Wilson Creek were lightly defoliated.

Sawfly larvae were common throughout the coastal forests, but in smaller numbers than in 1957. The only noticeable defoliation was observed on balsam at Lorenzetta Creek between Chilliwack and Hope on the Fraser River. Collections: Coast 294, Interior 325.

Pine Needle Scale, *Phenacaspis pinifoliae* (Fitch)—The pine needle scale infestations between Naramata and Okanagan Falls persisted on ponderosa pine. This scale was most abundant in 70 acres of ponderosa pine west of Summerland and in a smaller stand east of Oliver. A severe outbreak appeared between Winfield and the south end of Woods Lake and a localized moderate infestation developed on ponderosa pine at Nicola.

The most northerly occurrence of this insect was on lodgepole pine at Tete Jaune.

A heavy infestation of pine needle scale on Douglas fir trees was observed at Elko Junction and between Canal Flats and Springbrook. A predacious lady-bird beetle, *Chilocorus* sp., was abundant in both localities.

Black Pine Leaf Scale, *Nuculaspis californica* (Coleman)—The black pine leaf scale infestation at Campbell Mountain and East Penticton persisted. A few lightly infested trees were discovered ½ mile south of Cascade, the first infestation record for this species in the Nelson Forest District.

Western Winter Moth, *Erranis vancouverensis* Hlst.—Two localized outbreaks of this looper occurred in the Vancouver Forest District. In Victoria, Garry oaks from Cedar Hill Cross Road to Mt. Douglas, and along Beach Drive were heavily defoliated in early June. Other broad-leaved trees as well as shrubs and plants were attacked. Forty per cent of the larvae collected were parasitized.

Vine maple in the Skookumchuck area on the Lillooet River was heavily defoliated. More than 100 larvae per 3-tree beating sample were collected. Larval parasitism was over 45 per cent. Collections: Coast 17, Interior 5.

Green Velvet Looper, *Epirrita autumnata* (Gn.)—Up to 45 larvae per sample were collected between Jordan River and Port Renfrew on Vancouver Island, and larvae were common in collections throughout the remainder of the Vancouver Forest District. The principal hosts were western hemlock and balsam. This was the first time since 1951 that this looper has been so common. Collections: Coast 108, Interior 11.

Oak Looper, *Lambdina somniaria* Hulst—A localized infestation of the oak looper caused severe defoliation to about 4 acres of Garry oak in Victoria. This is the first time in 6 years that this insect has been present in large numbers. No parasites were obtained from mass rearings. Collections: Coast 7.

Yellow-lined Forest Looper, *Nyctobia limitaria* Wlk.—This looper was common in collections throughout the Vancouver Forest District, but was most numerous on northern Vancouver Island where up to 26 larvae were collected per sample. Collections: Coast 117, Interior 91.

Poplar and Willow Borer, *Sternochetus lapathi* (L.)—An infestation of this borer was first observed in 1958, covering some 250 acres of mature willows along the Thompson River near Tranquille. Most of the willows are now dead. Tree mortality may possibly be attributed to combined flooding and weevil attack. On July 21 living adults were observed in their galleries above the flood level; those below the high water mark had drowned in the larval stage.

Severe damage also occurred in the Nelson Forest District, notably at Skookumchuck Prairie, west of Jaffray, and 12 miles north of Fernie.

This species was common on southern Vancouver Island and in the Fraser and Anderson River valleys where it was found up to altitudes of 3,500 feet. Damage was noticeable along Silver Creek from the Trans Canada Highway to the International Border, in a small area 4 miles east of Agassiz, and near Hope. In the latter locality most of the willows in an area of 1 square mile were heavily infested and many trees were killed.

Aspen Leaf Miner, *Phyllocnistis populiella* Cham.—In 1958 the aspen leaf miner was again abundant throughout much of the range of trembling aspen in the Province. Vast numbers of moths were observed at many localities during July, notably among conifers adjoining aspen stands.

Leaf Miners on Willow and Cottonwood, *Phyllocnistis* spp.—A species of *Phyllocnistis* was abundant on black cottonwood in some localities along the Alaska Highway in British Columbia, notably between mile 500 and 570 where up to 100 per cent of the foliage was infested. The same species was found on black cottonwood in a few localities in the central part of the Nelson Forest District where up to 85 per cent of the foliage was infested.

Black cottonwood in the Upper Skeena River Valley along the Kitimat River, and at Stewart, were heavily attacked by a miner tentatively identified as *Phyllocnistis* sp. poss. *populiella.* Another miner, *Lithocolletis* sp. was found in association with *Phyllocnistis* on cottonwood.

Another species of *Phyllocnistis* infested up to 38 per cent of willow leaves at some places along the Alaska Highway.

Satin Moth, *Stilpnotia salicis* (L.)—The satin moth has become a prominent pest of poplar shade trees throughout the Okanagan Valley. Severe defoliation occurred in and near the major residential centers of the Okanagan; numerous infested shade trees were sprayed in Penticton, Kelowna, and Vernon shortly after the period of egg hatch.

Satin moths were abundant in scattered poplar groves from Stump Lake northward to and eastward along the South Thompson River; a few specimens were taken at Celista and Salmon Arm.

On the Coast some silver poplar, Lombardy poplar, and aspen trees were defoliated at Nanaimo and Victoria. Larvae in some localities were heavily parasitized, larvae often being covered with many eggs. Only 71 parasites emerged from the 1,366 reared. Larval mortality, however, was high presumably from extreme competition among parasites. Collections: Coast, 12, Interior 6.

Spruce Aphid, *Neomyzaphis abietina* (Wlkr.)—Sitka spruce and blue spruce trees on the southern tip of Vancouver Island and in the Fraser River

Valley from Vancouver to Chilliwack were heavily attacked by this aphid. Some natural stands were infested, but heaviest damage was confined to ornamentals and shelter belts. In nearly all areas some spruces lost all their old foliage, and some trees died in Victoria, in North and West Vancouver, and in Chilliwack.

Silver-spotted Tiger Moth, *Halisidota argentata* Pack.—The silver-spotted tiger moth, which was not found in the southern portion of Vancouver Island in 1957, reappeared in 1958. Webs were observed along the highway from the Malahat to Courtenay, and on North Pender, Mayne, Valdes, Galiano, Salt Spring, and Denman islands. Colony counts made in October indicate a considerable increase in 1959. Collections: Coast 13.

Striped Alder Sawfly *Hemichroa crocea* (Fourc.)—The infestation in the Coquitlam Valley, South Vancouver District, continued in 1958. Defoliation was less severe than in 1957. Collections: Coast 11, Interior 1.

Fall Webworm, *Hyphantria cunea* (Drury)—The fall webworm was more common on chokecherry, black cottonwood, and other broad-leaved trees in the Kamloops Forest District and in the western portion of the Nelson Forest District.

The fall webworm was also common throughout the southwestern coastal area. Heavy feeding occurred along both sides of the lower Fraser River Valley on alder, cottonwood, willow, and fruit trees, but was most severe between Hope and Rosedale where many young alders were completely defoliated. Up to 10 tents were found on individual trees. Collections: Coast 7, Interior 14.

Douglas-fir Tussock Moth, *Hemerocampa pseudotsugata* McD.—There was a slight increase in the numbers of larvae in the Lillooet area. Collections: Interior 10.

Sequoia Pitch Moth, *Vespamima sequoiae* (Hy. Edw.)—Considerable damage was caused to lodgepole pines along the Lillooet River from Lillooet Lake to Port Douglas. Trees up to 6 inches D.B.H. were attacked, some in as many as six places on the stem, and many trees were completely girdled.

Engelmann-spruce Weevil, *Pissodes engelmanni* Hopk.—The Engelmann-spruce weevil persisted in widely separated localities of the Interior. In the East Kootenay district this weevil had attacked spruce reproduction on 4-acre sample plots as follows: at Michel Creek 67 per cent of the stems showed old damage and 47 per cent were currently infested; at Hawkins Creek 62 per cent showed old damage and 35 per cent were currently infested.

A Pine Root Weevil, *Hylobius* sp.—In the Kettle River Valley north of Westbridge, lodgepole pine saplings up to 4 inches D.B.H. had been killed by *Hylobius* larvae feeding on the root collar. Mature lodgepole pine trees along Damfino Creek apparently injured by these weevils have recently succumbed to attack by *Dendroctonus monticolae.*

Sawyer Beetles, *Monochamus* sp.—Larvae of the genus *Monochamus* caused severe deterioration of mature white spruce timber that had been killed by fires north of Prince George. An average of 1.2 larval entrance holes per square foot of wood surface was recorded in trees killed by a fire that began on May 24, 1958, and an average of 0.8 entrance holes per square foot in timber killed by a fire that began on June 5. Maximum penetration of tunnels in sample blocks cut in October, 1958, was 5¼ inches.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)—This defoliator was again numerous in some trembling aspen along the Alaska Highway. On

the Mayo-Dawson Road defoliation was 75 to 90 per cent between mile 105 and 106. The infestation in the Salmon River Valley along the Hart Highway remained at a high level, with an average defoliation of 50 per cent. Collections: Interior 1.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)—Only a few colonies were found on eastern larch as follows: near Moberly Lake, along the Hart Highway, at various points along the Alaska Highway south of the Yukon border, and at Cluculz Lake. No larvae were collected in the western larch stands of the southern Interior. Collections: Interior 6.

Blotch Miners, *Lithocolletis* spp.—A blotch miner of trembling aspen was numerous in widely scattered localities. Medium to severe infestations were observed near Stewart Crossing, Y.T. Light infestations were observed from Vanderhoof north to Pinchi Lake and west to Endako. Patches of trees with 30 to 50 per cent of the leaves infested occurred in the eastern part of the Nelson Forest District.

Another species of *Lithocolletis* was abundant on black cottonwood at a few localities on Okanagan and Kalamalka lakes.

A Willow Leaf Blotch Miner, *Lyonetia saliciella* Busck—A medium to heavy infestation of miners persisted in willows in the Nelson Forest District. They were also numerous in northern B.C., notably west of Atlin and between mile 524 and 602 on the Alaska Highway.

Lyonetia sp. was abundant on birch at Trout Lake, and on black cottonwood at Summit Lake, east of Nakusp.

Ugly-nest Caterpillar *Archips cerasivoranus* (Fitch)—Webs were again numerous on chokecherry shrubs along the South Thompson River from Savona to Chase and along the North Thompson to Birch Island. Very few were observed in the Nelson Forest District. Collections: Interior 8.

A Ponderosa-pine Cone Borer, *Dioryctria auranticella* (Grt.)—There was a general increase in the percentage of cones infested by *Dioryctria auranticella* in the Okanagan and the Thomspon River valleys. From 50 to 100 per cent of the cones sampled were infested. In the Merritt Valley the infestation declined considerably.

Cone damage was light in Nelson Forest District.

A Douglas-fir Cone Moth, *Barbara colfaxiana* Kft.—This pest was present in moderate numbers in the Okanagan Valley. In the neighborhood of Kamloops an average of 20 per cent of the cones were infested.

Severe infestations were noted near Roosville and Invermere in the Nelson Forest District.

Pine Needle Miner, *Zelleria haimbachi* Busck—The majority pure stands of ponderosa pine between Venables Valley and Twaal Creek near Ashcroft were infested by this miner. Many of the trees 2 to 4 inches D.B.H. had most of the terminals damaged.

This miner was also common in the Southern Kootenays on ponderosa pine.

Birch Skeletonizer, *Bucculatrix canadensisella* Chamb.—Once again birch foliage was skeletonized by *Bucclatrix* larvae along the upper Canoe River and as far north as Tête Jaune. About 80 per cent of the leaves were infested.

Ambrosia Beetles, *Trypodendron lineatum* (Oliv.)—Trees killed by the Douglas-fir beetle were moderately infested by ambrosia beetles near Lazaroff Lake north of Quesnel. In the coastal area ambrosia beetles continued to attack favourable felled and cold-decked timber.

Pine Tube Moth, *Argyrotaenia pinatubana* (Kft.)—The infestation in lodgepole pine saplings in the eastern Nelson Forest District persisted and appeared to increase. Larvae were most abundant south of Kimberley Airport, north of Springbrook, and along the Premier Lake Road, Nelson Forest District.

Leaf-eating Beetles, *Chrysomelidae*—Leaf-eating beetles caused noticeable defoliation of cottonwoods, willows, alders, and birches in the Nelson Forest District. *Altica* spp. feeding resulted in discoloration of the foliage of mountain alder in the Creston Ranger District, birch near Fort Steele, and cottonwoods near Boswell and Gray Creek.

Altica sp. caused light to medium damage to alders along Trepanege River and south of Kelowna airport.

Galerucella sp. caused noteworthy defoliation of willows in the upper Kettle River Valley north of Westbridge and throughout East Kootenay.

Severe skeletonization and defoliation of cottonwood reproduction by *Chrysomela* sp. was observed along Bucking Horse River in northern British Columbia.

Sawflies on Spruce, *Pikonema* spp.—*Pikonema alaskensis* Roh. and *P. dimmockii* Cress. caused light defoliation of white spruce trees from Vanderhoof west to Endako and Francois Lake. *P. alaskensis* caused moderate defoliation of Engelmann spruce at Wasa Lake. Collections: Interior 168.

Variegated Cutworm, *Peridroma margaritosa* (Haw.)—This cutworm, usually associated with non-forest hosts, caused considerable damage to several beds of Douglas fir seedlings at the Duncan nursery on Vancouver Island. Eggs collected off silver poplar hatched and were reared through to adults, establishing a new host record for British Columbia. Collections: Coast 8.

Bruce Spanworm, *Operophtera bruceata* Hulst—In 1958 the Bruce spanworm attained severe infestation proportions in trembling aspen stands along the Hart Highway and along the southern part of the Alaska Highway. Aspen stands at the following locations were completely denuded of leaves: Little Prairie, East Pine, Dawson Creek, south of Fort St. John and between mile 1 and 2 on the Hudson Hope Road. Collections: Interior 26.

Mourning-cloak Butterfly, *Nymphalis antiopa* L.—Larval colonies were common on willow and other hosts in the Interior; they were particularly abundant in the Yellowhead Pass. The most northerly infestation occurred on willow and aspen at Mayo, Y.T. Collections: Coast 3, Interior 24.

Aphids on Ponderosa Pine Needles, *Essigella* spp.—Dr. K. Graham, of the University of British Columbia reported the occurrence of a severe infestation of *Essigella* sp. on ponderosa pines near Hat Creek. Other severe infestations of *Essigella* on ponderosa pine trees were recorded at Sweets Bridge, Glenemma Range, and along lower Whiteman Creek. Specimens collected at Sweets Bridge were identified as *E. gillettii* Hottes.

A Woolly Aphid on Larch, *Adelges oregonensis* Annand—Young open-grown larch stands over several square miles between Rock Creek Canyon and Camp McKinney, Nelson Forest District, were heavily infested by *Adelges oregonensis.* The aphids were so numerous that some trees appeared whitish.

A Cicada, *Okanagana rimosa* (Say)—This species was more abundant than usual in the western part of the Nelson Forest District. Oviposition damage was observed on birch, willows, forest shrubs, and on Douglas-fir.

A Webworm on Juniper, *Phalonia* sp.—For the first time the Survey reared adults of this species from common juniper near Fort Steele. Some junipers were severely infested and turned brown in June. Collections: Interior 4.

Mites on Ponderosa Pine,—Tetranychid and Tenuipalpid mites caused noticeable damage to the needles of ponderosa pine in the southern Okanagan Valley.

PROVINCE OF BRITISH COLUMBIA

FOREST DISEASE SURVEY

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INTRODUCTION

Weather conditions in 1958, which resulted in one of the most costly forest fire years in British Columbia history, were also responsible for direct losses in the form of drought injury, radiation damage, and heat defoliation. Reports of damage were received from most sections of the Province, but the symptoms of drought injury were most conspicuous in the normally humid Vancouver Island and lower Coast Region. In general, damage was confined to marginal sites and individual trees, but it must be remembered that delayed effects of this drought may not show up until the 1959 growing season or even later, and that these less conspicuous losses may be more severe.

An unusually severe outbreak of needle blight caused by *Elytroderma deformans* (Weir) Darker affected yellow pine, and to a less extent lodgepole pine, throughout the range of the former host, with the exception of the north Okanagan Valley and the East Kootenays where the disease incidence continued at a low level.

Other disease conditions in 1958 were not considered abnormal. The large list of new records in the "Noteworthy Diseases" section resulted from the broadening sphere of the Survey's activities rather than from new or unusual disease outbreaks.

The British Columbia Disease Survey Section has been strengthened by the appointment of a Research Officer to study dieback and canker and canker diseases of conifers with particular reference to their cultural identification. Special attention to this important group of diseases will be of considerable aid to the Survey in meeting both its local and national objectives.

While the Survey has been strengthened locally reliance will continue on the support of the Mycology Unit, Botany and Plant Pathology Division, Ottawa, and of many other co-operators whose valuable help is gratefully acknowledged.

A total of 2,443 collections were submitted in 1958 including 133 new additions to the herbarium, some of which are listed under "Noteworthy Diseases". A summary of these collections according to host tree is as follows:

Coniferous Trees	Collections		Broad-leaved Trees	Collections	
Fir			Alder		
Alpine	574		Red	20	
Grand	22		Sitka	1	
Amabilis	15		Miscellaneous alders	10	
		611			31
Douglas fir		602			

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Coniferous Trees	Collections	
Spruce		
White	335	
Sitka	11	
Engelmann	3	
Black	1	
Miscellaneous spruces	3	
		353
Pine		
Ponderosa	141	
Lodgepole	65	
Western white	64	
Miscellaneous pines	11	
		281
Hemlock, western		60
Cedar		
Yellow	23	
Port Orford	17	
Western red	14	
		54
Cypress, Monterey		45
Larch		
Western	12	
European	5	
Miscellaneous larch	2	
		19
Juniper, Rocky Mountain		1
Yew, western		1
		2,027

Broad-leaved Trees	Collections
Willow	31
Aspen, trembling	29
Cottonwood, black	25
Maple, broadleaf	11
Arbutus	10
Cherry	6
Birch, western white	3
Ash, mountain	2
Total	148

Miscellaneous or host not specified	268
Grand Total	2,443

IMPORTANT DISEASES

Weather Injury—As a result of an exceptionally dry and hot summer, with below average precipitation and above average temperatures prevailing from May to August, a considerable number of reports of damage directly or indirectly attributable to these conditions were received from most regions of the Province. Signs of injury were recorded as early as the end of June, but did not become conspicuous until late July and early August.

A survey on Vancouver Island, where symptoms of drought injury were particularly conspicuous, indicated the visible damage to be most prevalent on rocky and excessively drained sites. The majority of the damage was recorded on reproduction and sapling sizes in both natural and planted stands, although scattered damage in the form of red tops was noted in older age groups. All tree species and a great variety of shrubs and herbs were affected. With Douglas fir it was not uncommon to find mortality, and trees suffering severe branch and stem kill tantamount to mortality, extending over 5 to 10 acres, consistent with the area of unfavourable edaphic conditions. Injury to individual trees took a great variety of forms from various degrees of browning through light to severe branch kill and mortality.

While it is generally true that diseases accompanied by excessive foliage discoloration appear more damaging than they actually are, it is also true that direct injury may be negligible compared to the losses attributable to secondary

invasion following weakening. Delayed effects should be anticipated in the early years following a severe drought and may be expected to show up in stands where little or no injury was apparent by the early conspicuous discoloration. In order to follow the progress of some of the more severely damaged stands, seven sample plots were established in the Campbell River area for subsequent observation.

Drought damage in the Interior was sporadic and became apparent late in the season. Interestingly, yellow pine, which occupies drier sites in regions characterized by hot summers, appeared to have suffered considerable damage. With this species secondary effects of dieback associated with *Cenangium ferruginosum* Fr. may be anticipated.

Frost damage was only infrequently reported during the past field season, which followed an unusually mild winter. A late spring frost apparently accounted for red belt damage to lodgepole pine at mile 386 and mile 400 to 406 on the Alaska Highway, and at Cassiar. Damage in all these areas was recorded at about 4,400 feet elevation.

Foliage Diseases—Yellow-pine needle blight caused by *Elytroderma deformans* (Weir) Darker reached a high level of infection not experienced since the initiation of an organized disease survey in British Columbia. An intensive survey conducted throughout the range of the host showed the infection to be general, reaching 100 per cent incidence in some localities. The Kamloops, Merritt, and Clinton areas were the most heavily hit with over 80 per cent of the trees sampled losing 25 per cent or more of their foliage. The North Okanagan and East Kootenay regions suffered only very light scattered infection. All severely affected stands contained a high percentage of trees with brooms indicating infections of long standing. This condition would suggest that such stands may be rated as high-hazard stands which by virtue of their particular location, topography, or stand characteristics frequently provide favourable conditions for infection. Further processing of survey data and study of weather records will be necessary to substantiate this observation. Several sample plots have been established for future observation.

Douglas fir needle blight caused by *Rhabdocline pseudotsugae* Syd. reached the highest intensity of infection recorded since 1950 in the East Kootenay region, maintaining its role as the major disease problem affecting the Christmas tree industry. Particularly heavily affected were the stands around Invermere. A research project on this problem is continuing.

Reports of other foliage diseases indicated an average year with some fairly heavily infected stands in localized areas.

Pullularia pullulans Build-up in Spruce Budworm Infestation Areas—It was reported in 1957 that *Pullularia pullulans* (de Bary) Berkhout was recovered from 95 per cent of a large sample of white spruce buds showing a slight necrosis at their tips. The sample had been collected following a report of excessive bud mortality from unknown causes in areas in the Babine Lake region defoliated by the spruce budworm, *Choristoneura fumiferana* (Clem.). Sampling from healthy trees outside the infestation showed the slight tip necrosis to be the usual condition for spruce buds. Isolations from these latter samples yielded little or no *Pullularia* in culture.

Monthly collections from inside and outside the budworm infestation at Babine Lake during the winter and spring, followed by a field examination in late May and early June clarified the situation considerably. The incidence of *P. pullulans* was in fact nine times as high in bud samples taken from inside the infestation area as those taken outside the infestation area, averaging 74 per

cent inside as compared to 8 per cent outside. However, this difference bore no relationship to the incidence of bud mortality of unknown origin inside or outside the infestation. Bud mortality, other than that caused by budworm mining, was relatively light in both areas, based on felled-tree sampling from the upper, middle, and lower crown. Bud mortality in the lower crown was found to be much heavier in both areas. This condition is apparently quite normal and consistent with weakening and self-pruning of lower branches. The original report of excessive bud mortality was probably based on a lower crown sample taken with pole pruners.

It may be concluded that heavy budworm defoliation and mining has not led to excessive fungus-induced or physiological mortality of white spruce buds. The extraordinary build up of *Pullularia pullulans* is interesting and appears to be due to the fact that budworm frass provides an excellent growth medium for the fungus. Isolations from a large sample of frass planted as single pellets on malt agar yielded 88 per cent *Pullularia*. However, the fungus has been reported on a number of occasions as a mild parasite and may be capable of invading weakened twigs or branches.

Dryocoetes-Leptographium Complex on Alpine Fir—In 1957 it was reported that heavy alpine fir mortality in the McGillivray Lake region of the Kamloops Forest District could only be explained in part by attacks of the bark beetle *Dryocoetes confusus* Sw. Fungus-induced lesions centred at bark beetle entrance holes were frequently of sufficient extent to girdle and kill trees. Cultural studies and pathogenicity tests have since revealed the fungus causing the lesions to be a species of *Leptographium* with a *Ceratocystis* perfect stage. There seems to be a close association between the fungus and the insect; after the examination of hundreds of insect galleries none was found without the characteristic lesions from which the fungus was readily isolated. Galleries 1 or more years old consistently bore the perfect fruiting stage of the fungus.

Another area has been found at Bolean Lake where several hundred acres of alpine fir are suffering mortality from this insect–disease complex and several other areas of apparently similar mortality have been spotted from the air.

Studies of the insect and the fungus are continuing to determine more specifically the nature of their relationship and the factors leading to host mortality.

Dieback on Douglas Fir Christmas Tree Stock—An early season report expressed concern over the possible spread of dieback in Christmas tree stands of Douglas fir in the Invermere and Canal Flats regions of the Nelson Forest District. Examination showed the condition to be of long standing and of general light incidence on the poor sites used for Christmas tree production. A number of localized areas of 2 to 3 acres in extent were found where the incidence exceeded 25 per cent of the stems.

The disease was characterized by dying back of branches with extensive cankers frequently being formed at the junction with the stem. Such cankers often girdled the stem, thus killing the distal portion. Signs of the causal agent were not found on diseased material, but isolates of diseased tissue on agar prepared at various times during the season produced fungus growth typical of *Hypoxylon* sp.

On the basis of this year's examination there is no reason to anticipate a sudden rapid spread of the disease. However, to confirm these findings, five

sample plots have been established in affected stands, and field and cultural studies are continuing.

Diseases of Non-indigenous Trees—Annual observations of exotic tree plantings since 1956 have provided sufficient background information to set up a rotation system for field examinations to be started in 1959. A total of 118 plantations are now registered with the Laboratory, an increase of 53 over 1957. It is no longer necessary, or physically possible, to carry out annual observations over the whole inventory. Only a representative series will be examined annually. The following outlines the basis on which the proposed rotation system is to be set up:

1. A portion of the plantations of each species will be selected for annual observations on the basis of site representation and geographic distribution.
2. The remaining plantations will be rotated to receive less frequent attention, probably at 5-year intervals.
3. A noteworthy disease outbreak affecting any species will receive special attention in all plantations of that species.

The 1958 examinations continued to demonstrate the relative importance of animal browsing as a major hazard to young plantations. Added to the list of offenders are moles and mice which cause severe damage in poplar plantations. Moles undermine the bases of young trees and mice cause severe girdling injury to roots and root crowns. In one poplar plantation 50 per cent mortality was attributed to damage by these rodents.

The severe drought took its toll of exotic trees along with their native counterparts, with damage being reported from many regions. Three very young plantations of Scots, red, and pinaster pine in the central Interior appeared to have suffered nearly 100 per cent mortality, as did a young plantation of European larch in the same region. Thirty-year-old larch and big tree (*Sequoia*) in the Fraser Valley suffered severe sunscald when a thinning, designed to remove competing weed species, was followed by abnormally high temperatures and drought.

Fungus-caused diseases in the predominantly young plantations of exotic species continue to be relatively unimportant compared with weed competition, animal damage, and climatic factors. Often too, the weight of these damaging agents tends to mask the symptoms and signs of fungus diseases which may otherwise be manifested. Each year, however, one or more new records of native diseases on exotics extends the list of potentially damaging diseases to be kept under observation. A new record for 1958 is a foliage disease on Lombardy poplar caused by *Taphrina populina* Fr. Only a few leaves on scattered trees were affected but observations will be continued. The disease has been seldom recorded in western North America and, although more common in the eastern United States and Canada, it has not caused severe damage.

A report of *Peridermium* sp. on Scots pine in the 1957 "Noteworthy Diseases" section has been confirmed as *Peridermium harknessii* J. P. Moore.

Disease conditions in forest nurseries—Damping-off was somewhat higher than normal in the Coast nurseries and continued at a high level at Cranbrook. The major losses on the Coast in 1958, however, resulted from heat damage. Losses as high as 50 per cent were recorded in some beds at the Duncan nursery.

OTHER NOTEWORTHY DISEASES

(V.I.—Vancouver Island; Q.C.I. —Queen Charlotte Islands)

Host	Organism	Locality	Remarks
Alder, red.....	*Didymosphaeria oregonensis* Goodding	Port Edward, Massett, Q.C.I.	Causing canker of main stem and branches of living trees. First record for B.C.
Aspen, trembling	*Marssonina brunnea* (Ellis & Everh.) Sacc.	Lillooet	Causing leaf spot of aspen. Similar to *M. populi*. First record for B.C.
Cottonwood, black	*Eutypa acharii* Tul.	Cinema	Associated with dieback. First record for B.C.
Fir, alpine.....	*Helminthosporium abietis* W. B. Cooke & Shaw *pro tem.*	Smithers	Sooty mold on *Abies amabilis* and *A. Lasiocarpa*. New record for B.C. (?)
	Peniophora separans Burt	Aleza Lake	New record for B.C. From culture.
	Uredinopsis hashiokai Hirats. f.	Cordova Bay, V.I.	Obtained by inoculation. Ref.: W. G. Ziller, Can. J. Bot. (in press). New world host record.
	Uredinopsis pteridis Diet. & Holw.	Cordova Bay, V.I.	Causing perennial needle rust. Obtained by inoculation, Ref.: W. G. Ziller, Can. J. Bot. (in press). New world host record (?).
Fir, amabilis....	*Flammula alnicola* (Fr.) Quél.	Duncan, V.I.	First host record for western North America. From culture.
	Merulius himantioides Fr.	Duncan, V.I.	First record for western North America. From culture.
	Uredinopsis pteridis Diet. & Holw.	Cordova Bay, V.I.	Causing perennial needle rust. Obtained by inoculation. Ref.: W. G. Ziller, Can. J. Bot. (in press). First host record for B.C.
Fir, Douglas....	*Chondropodium pseudotsugae* White	Lake Cowichan, V.I.	Obtained in culture and identified by A. Funk. On bark of branch of D. fir.
	Corticium fuscostratum Burt	Clinton	New host record for western North America. From culture.
	Corticium inopinatum Jacks.	Sooke, V.I.	New host record for western North America.
	Peniophora septentrionalis Laurila	Prince George	New host record for western North America. From culture.
	Tympanis pseudotsugae Groves	Lake Cowichan, V.I.	Associated with dieback. Identified from culture only by A. Funk. On twigs of D. fir.
Fir, grand.....	*Uuredinopsis hashiokai* Hirats. f.	Cordova Bay, V.I.	Causing perennial needle rust. Obtained by inoculation. Ref.: W. G. Ziller, Can. J. Bot. (in press). First world host record.
	Uredinopsis pteridis Diet. & Holw.	Cordova Bay, V.I.	Causing perennial needle rust on *Abies* spp. Obtained by inoculation. Ref.: W. G. Ziller, Can. J. Bot. (in press).
Hemlock, western.....	*Mollisia pinastri* (Cooke & Peck) Sacc.	Port Clements, Q.C.I.	New record for at least western North America on hemlock needles.
	Peniophora cinerea (Pers. ex Fr.) Cooke	Revelstoke	First host record for western North America. From culture.
Larch, western..	*Coniophora puteana* (Schum. ex Fr.) Karst.	Lumby	First host record for western North America. From culture.
	Corticium galactinum (Fr.) Burt	Lumby	First host record for western North America. From culture.
	Melampsora medusae Thüm.	Greenwood	First record of the fungus for B.C.
	Stereum chailletii (Pers. ex Fr.) Fr.	Vernon	First host record for western North America. From culture.
	Stereum sanguinolentum (Alb. & Schw. ex Fr.) Fr.	Vernon	First host record for B.C. From culture.

[1] Complete lists of fungi collected in British Columbia and deposited at the herbarium in Victoria (DAVFP) are available at the Forest Biology Laboratory, Victoria, B.C.

OTHER NOTEWORTHY DISEASES—Concluded

Host	Organism	Locality	Remarks
Maple, broadleaf.	*Schizophyllum commune* Fr.	Vancouver	First host record for B.C.
Oak, Garry.....	*Polyporus cuticularis* Bull. ex Fries	Victoria, V.I.	First host record for B.C. From culture.
Pine, eastern white (cultivated)	*Cronartium ribicola* J. C. Fischer	Nanaimo, V.I.	First herbarium record. From plantation.
Pine, ponderosa	*Coniophora puteana* (Schum. ex Fr.) Karst.	Moyie Lake	First host record for western North America. From culture.
	Fomes pinicola (Swartz ex Fr.) Cooke	Princeton	First host record for B.C. From culture
	Merulius himantioides Fr.	Lytton	First host record for western North America. From culture.
	Merulius lacrymans Wulf. ex Fr.	Princeton	First host record for western North America. From culture.
	Peniophora phlebioides Jacks. & Deard.	Princeton	New host record for western North America. From culture.
	Polyporus tomentosus Fr. var. *circinatus* (Fr.) Sartory & Maire	Princeton	New host record for B.C. From culture.
Pine, Scots (cultivated)...	*Peridermium harknessii* J. P. Moore	Prince George	In Scots pine plantation at Experimental Farm, Prince George.
Poplar, Lombardy (cultivated)...	*Taphrina populina* Fr.	Nanaimo, V.I. Sidney, V.I.	Causing yellow leaf spot. New record for B.C. (?).
Rhabdocline pseudotsugae on Douglas fir.	*Hymenula* sp.	Malahat, V.I.	Hyperparasite on *Rhabdocline pseudotsugae* Syd. One tree heavily affected. Possibly a new world host record.
Spruce, Engelmann...	*Arceuthobium* sp.	Cranbrook Grand Forks	New record for B.C. *A. americanum* reported by Kuijt at Kananaskis, Alta. Ref.: J. Kuijt. Bot. Rev. 21, No. 10, (1955) *Arceuthobium americanum*, *A. pusillum*, and *A. campylopodum* are known on *Picea* spp. None is reported by Kuijt to occur on *Picea engelmannii*. Possibly a new world host record.
Spruce, white...	*Corticium laeve* Pers. ex Fr.	Aleza Lake	New host record for western North America. From culture.
	Pleurotus ostreatus (Jacq. ex Fr.) Quél.	Aleza Lake	New host record for western North America. From culture.
	Polyporus schweinitzii Fr.	Crescent Spur	New host record for western North America. From culture.
	Trechispora raduloides (Karst.) Rog.	Aleza Lake	New host record for western North America. From culture.
Willow, Scouler's	*Merulius confluens* Schw.	Royal Oak, V.I.	New host record for western North America.

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